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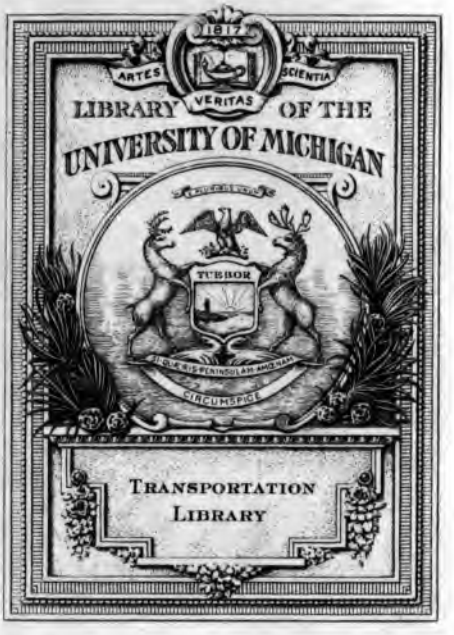
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REPORTS

RELATING TO THE

PROJECT OF CONSTRUCTING A RAILWAY,

AND A LINE OF

ELECTRO-MAGNETIC TELEGRAPH,

THROUGH THE PROVINCE OE NEW BRUNSWICK,

FROM

HALIFAX TO QUEBEC.

Presented to the Legislative Council and Assembly on the 3rd day of February 1847.

PRINTED BY ORDER OF THE HOUSE OF ASSEMBLY.

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Copy of Instructions from the Provincial Secretary to the Government Emigration Agent.

Secretary's Office, Fredericton, 26th October, 1846.

SIR,—I am directed by his Excellency the Lieutenant-Governor to inform you of your appointment to the undermentioned service, and to communicate to you the following Heads of Instructions for your guidance in the execution of the duty intrusted to you :—

Her Majesty's Government having undertaken to ascertain by exploration and survey, the practicability of constructing a trunk railway from the eastern coast of Nova Scotia to Quebec, which will necessarily traverse this province, and some intelligent officers of the Royal Engineers being at present engaged in this exploration, it has become necessary, in order to enable the Provincial Government to co-operate effectually in this important undertaking, to prosecute certain inquiries in regard to the resources of the country which may be traversed by the railway, and the means it would be likely to afford of rendering them more extensively available, not only to the people of the province, but to those of the United Kingdom.

The prosecution of these inquiries is intrusted to you, with a view to which you are instructed to put yourself into communication with the officers who are employed; and having ascertained from them the direction of the lines explored by them, to examine the nature of the country, fertility of the soil, the indications of mineral resources on or adjacent to such lines, and the local advantages for settlement at particular sites where stations are likely to be fixed.

Your attention should also be particularly given to the measure of establishing branch railways to connect the trunk line with Fredericton, St. John, St. Andrews, Woodstock, Miramichi, Richibucto, Dalhousie, and other ports and places in the province, to which they might be profitably carried. And as the project is likely to be revived of connecting the Bay of Fundy with the Gulf of St. Lawrence, by short railways across the isthmus at the head of the bay, which would necessarily constitute branches of the trunk railway, it would be desirable to ascertain in particular the nature and amount of the traffic to which the establishment of such lines would give rise, especially the encouragement they would give to the fisheries, and the facilities they would afford of prosecuting them in the Gulf of St. Lawrence, and on the coast of Labrador. The positions along the trunk line from whence these and other branches should be carried, ought to be indicated with reference to the nature of the country to be traversed, and the greatest facilities of access to other places with which a beneficial intercourse might be established.

As it is understood that coal and timber may be conveyed by railway with facility, as well as lighter goods, the practicability of obtaining at all seasons supplies of these commodities at Fredericton and St. John more cheaply and expeditiously than can now be accomplished by sea and river navigation, should be ascertained, and the facilities that would also be afforded for the transport, at moderate rates, of the productions of agriculture and the fisheries.

Although the exploration now in progress will hereafter be followed by precise surveys, from which the distances will be correctly ascertained, it may be practicable to estimate in a general way the length of the projected railways between the principal ports and places, and the time that would be employed in the transit of passengers and goods; also the cost per mile for their construction.

Any information as to the practicability of keeping the trunk railway and its branches open in the winter, and thus securing the communication throughout the year, would be of great value, not only to those places where the navigation is closed in winter, but where it is open, as in the Bay of Fundy; thereby affording at all times an uninterrupted outlet for the commerce of this and the neighbouring provinces. The branches of trade that might be opened or facilitated should be subject to your investigation, and the probable influence of such trade, not only on the principal places to which it may be carried, but on the counties that would be immediately traversed by the trunk railway and its several branches; and with this view some account should be given of the description, quality, and value of the timber trees, and of the agricultural and mineral productions of the several counties, and of the sea and river fisheries.

The prospect of opening extensive and valuable tracts of wilderness land to settlers, and of forming prosperous settlements at the railway stations, should lead to such inquiries as will enable you to determine the most effective means of providing for the success of such settlements, and the welfare of those who might embark in them; also the probability of a profitable passenger traffic arising from these undertakings, as well during the progress of the work as after the railway may be finally opened between the Atlantic and Quebec.

Any other information connected with this important project which you may acquire, and which may assist in forming a judgment of the practicability and probable advantages of the undertaking, locally and generally, you are requested to include in your Report; and in particular the prospect of being able to establish a direct intercourse by steam navigation with the United Kingdom for the conveyance of emigrants to the province, and the export of certain articles of produce to and from Europe.

I have the honour to be, &c.,

(Signed) JOHN S. SAUNDERS.

To M. H. Perley, Esq.
&c. &c. &c.

Government Emigration Office, St. John, N. B.
25th January, 1847.

SIR,—I have the honour to state, that in obedience to the instructions furnished by you under date 26th October last, with reference to the prosecution of certain inquiries in connection with the exploration and survey, by Her Majesty's Government, of the line for a railway from the Atlantic to Quebec, I have attended diligently to the duties therein assigned me, and now respectfully submit the following statement, with the several documents which accompany this communication.

It has already been officially announced that Capt. Pipon, R.E., the officer in charge of the railway exploration and survey, was accidentally drowned in the river Restigouche, on the 28th October last, while endea-

vouring to save the life of a fellow creature. Owing to this melancholy and most unfortunate event, some delay occurred in placing myself in communication with Lieut. Henderson, R.E., upon whom the whole charge of the survey most suddenly and unexpectedly devolved. That officer has kindly communicated all the information he is enabled to give at present; and I am thus enabled to describe the several routes explored the past season by the surveying parties engaged in that service.

One party of sappers and miners, under Lieutenant Henderson, and accompanied by Mr. Wightman, a surveyor from Nova Scotia, commenced their labours at the boundary between this province and Nova Scotia, near the head of Bay Verte. This party explored the country, on a line nearly parallel with the Gulf shore of this province, to the head of the tide on the south-west Miramichi, crossing the Shediac, Cocagne, Buctouche, Richibucto, and other rivers on the route, above the tide-way on each. After crossing the south-west Miramichi, this party proceeded up the valley of the north-west Miramichi, to the northern boundary line of the county of Northumberland, and there separated into two divisions, one of which descended the valley of the Nepisiquit for some distance, and then followed a north-westerly course, nearly parallel with the southern coast of the Bay of Chaleur, terminating their exploration above the head of the tide on the Restigouche river, nearly opposite the mouth of the Matapediac river. The other division crossed the upper waters of the Nepisiquit river, and followed up the valley of Middle river, thence through and across the vallies of the Upsalquitch and its tributaries, to the Restigouche, at the mouth of the Quotawam-Kedgewick, or north-west branch of that river, which, however, is now believed to be the main Restigouche, and not a tributary of what has heretofore been supposed the principal stream.

A second party of sappers and miners commenced their duties at high-water mark on the wharf at the bend of Petitcodiac, and thence followed the route formerly surveyed for a portion of the line of a military road, under the direction of Colonel Holloway, R.E., to Boiestown; thence up the valley of the south-west Miramichi, to the river Tobique, above the Red Rapids, and thence a course nearly north-west, to the Waagan Portage, between Grand River, a tributary of the St. John, and a small tributary of the Restigouche.

A third surveying party, under Mr. John Grant, of the Crown Land Department, was employed in exploring the valley of the Tobique, and the neighbouring hills.

The sudden death of Captain Pipon, and the early setting in of winter at the north, brought the labours of the season to a close without any exploration being made north of the Restigouche. That service Lieutenant Henderson proposes commencing as early as possible the coming season.

On the several lines explored, much broken and hilly country has been found northward of the south-west Miramichi, especially in the vicinities of the Nepisiquit and Tobique rivers. A further examination of the lines already explored, and of other lines of country, will be requisite next season, in order to ascertain the best and most practicable route for the line of the proposed trunk railway; until that is ascertained, and the country north of the Restigouche is thoroughly explored, the general direction of the line from the Atlantic to Quebec, through New Brunswick, cannot be determined. So soon, however, as that important decision takes place, the

precise survey will be commenced with strong parties fully qualified for that service.

The line of the proposed trunk railway not being yet ascertained, I cannot, of course, report upon the various matters referred to me with regard to the line of country to be traversed; but that duty will be attended to hereafter, when the precise survey commences.

I have now, however, the honour to submit herewith, a Report upon the several counties of New Brunswick, with reference to their trade, agriculture, fisheries, resources, and capabilities; as also tables compiled by myself, showing the principal articles exported from the port of St. John and its out-bays, from 1819 to 1845, both years inclusive; the estimated value in pounds sterling of the imports and exports of New Brunswick, from 1828 to 1845, both years inclusive; and the numbers and tonnage of the ships built in this province, from 1825 to 1845, both years inclusive.

I have the honour also to append a Report on the forest trees of New Brunswick, describing the most valuable timber trees, and their uses and properties, which is submitted with great deference, and for which every indulgence is claimed as the work of one who is not a professed naturalist.

The revived project of connecting the Bay of Fundy with the Gulf of St. Lawrence, adverted to in my instructions, being a subject of great importance, I visited the county of Westmorland, for the purpose of collecting information with respect to it. The information obtained is embodied in the Report on counties, under the head of Westmorland, where also will be found some valuable statistics of the population, trade, agriculture, and fisheries of Prince Edward Island, compiled from returns furnished by the Honourable T. H. Haviland, secretary of that colony, to whom I am under much obligation.

With reference to that portion of my instructions requiring information as to the practicability of keeping the trunk railway and its branches open in winter, and thus securing the communication throughout the year, I am enabled to state, on the authority of E. H. Derby, Esq., of Boston, a well known legal gentleman of high standing, extensively connected with railways in Massachusetts, that the railway lines in New England have not sustained any very serious inconvenience of a permanent character from snow. Every railway is provided with mammoth snow ploughs, of sufficient height and width to clear a passage for the trains, each plough having two mould boards. These ploughs are impelled forward by two or three engines placed behind, and thus the track is cleared of snow after a storm. When the snow is light, a single engine performs the duty; but when the snow is long continued, and has accumulated to the depth of four or five feet, which sometimes happens in Berkshire county, Massachusetts, where the western railroad surmounts an elevation 1440 feet above the sea, more serious difficulties are encountered than in ordinary cases. The snow, after being repeatedly pressed out by the plough, occasionally becomes solid on each side of the road; the subsequent falls of snow, and the drifting snow which lodges in the track, at such times require a strong force with shovels to clear the way.

Drifts, however, are prevented in some places on the New England lines, by board fences eight feet high, parallel to the tracks, at a few rods distance, against which the snow drives up and lodges in large masses; these fences have been christened "Snow-traps." From the best informa-

tion it is stated that the expense of removing snow from the railroads of New England falls much short of 100 dollars (equal to 21*l.* sterling), per mile per annum.

The snow plough is used on the Great North of England Railway and other railways in that part of England which are sometimes impeded with snow. It is stated by a gentleman who has been connected with the working of these railways, that they suffer but trifling impediment from snow, although it falls frequently to some depth; but that sleet in the winter season, by rendering the rails icy and slippery, at times delays the trains. The remedy for this is strewing the rails either with sand or ashes.

As an almost indispensable adjunct to railways, the electric telegraph is becoming universally applied. It is now proposed, that without waiting for the establishment of the trunk railway through these provinces, a telegraphic communication shall immediately be established from Halifax to Quebec by the ordinary post routes now in use. With this view, a Company has been formed in Quebec during the present month, with a capital of 6,500*l.*, in shares of 10*l.* each; which amount, it is presumed, will be sufficient to establish the line from Quebec to the boundary of this province. It is proposed that the provinces of New Brunswick and Nova Scotia shall form separate Companies to establish and manage the line, each within its own colony. With the present extremely high rates of postage in these colonies, and the dilatory mode of post communication, apart from all other considerations, there can be very little doubt that telegraphic lines between the different towns on the route (as, for instance, between St. John and Fredericton), would pay from the very outset. The question, therefore, arises, whether the telegraph would not be better managed from Halifax to Quebec, and thence to the extreme western part of Canada, by one Company acting on a uniform system, or whether it would not even be more desirable that the whole line should be established throughout by the Imperial Government, which would secure proper arrangements for the transmission of important intelligence, and prevent those frauds and abuses which have occurred where lines are under the control of Companies or individuals.

If established by the Government, the Board of Ordnance would be able to appoint intelligent men from that branch of the service, who would perform the duties at the various stations in a most satisfactory manner, at moderate rates of pay.

The value and importance of the sea and river fisheries of New Brunswick, the extent to which they might be profitably carried, and the impetus which would be given them by increased facilities of internal communication, are subjects which demand special attention and the most careful and patient investigation. At present no sufficient data or precise information exists from which correct or positive statements can be made with reference to these fisheries; and I am, therefore, precluded from noticing them, except incidentally, in the Reports now submitted. This deficiency I hope to be able to supply to some extent in another season, after careful inquiry and research.

I have the honour to be, Sir,
Your very obedient servant,
M. H. PERLEY,
Government Emigration Agent.

The Hon. John S. Saunders, Provincial Secretary.

Report on the several Counties of New Brunswick, with reference to their Trade, Agriculture, Fisheries, Resources, and Capabilities, and including Statistics of Prince Edward Island, by M. H. Perley, Government Emigration Agent. January, 1847.

COUNTY OF RESTIGOUCHE.

THIS county, the most northerly in the province, was formerly part of Northumberland, and afterwards a part of the county of Gloucester. It was erected into a separate county by Act of Assembly in 1837, and its northerly boundary is the line which separates New Brunswick from Lower Canada. It contains 1,266,560 acres, of which 156,979 acres only are granted and located, leaving 1,109,581 acres still vacant. The whole population in 1840 was 3,161, and the quantity of cleared land 5,579 acres. The settlements are almost exclusively confined to the shores of the Bay of Chaleur and the banks of the river Restigouche; a large proportion of the land under cultivation is exceedingly rich and fertile. Limestone and marl abound on the coast of the Bay of Chaleur within this county, and the soil on the banks of the Restigouche (especially at the "Flat-lands" above Campbelltown), is of excellent quality. The interior of the county, being in a wilderness state, and almost wholly unexplored, very little can be said of its resources or capabilities. The late Deputy Hunter has spoken in high terms of the excellence of the soil on the Upsalquitch, and to the southward and eastward of Campbelltown.

The principal exports of this county are furnished by its forests and the fisheries, and the extent of its trade may be estimated from the following Table of articles exported from 1835 to 1845, both inclusive :—

Articles.	1835	1836	1837	1838	1839
Timber . . . . Tons	31,974	32,945	39,357	44,485	42,229
Boards and Planks . M.	281	322	481	..	..
Deals . . . . . M. feet	..	..	..	336	1,349
Masts and Spars . . No.	174	192	261	433	515
Lathwood . . . . Cords	703	641	781	883	945
Shingles . . . . M.	60	40	881	487	402
Staves . . . . . M.	35	75	16	..	12
Oars . . . . . No.	400	248	442	666	296
Handspikes . . . No.	6	100	240	120	..
Dried Fish . . . Quintals	1,238	1,600	60	300	30
Herrings . . . . Barrels	20	235	63	231	136
Salmon . . . . ,,	486	330	278	186	125
Fish Oil . . . . Gallons	..	..	1,088	62	190
Grindstones . . . Pieces	..	..	..	..	..

Articles.	1840	1841	1842	1843	1844	1845
Timber . . . . Tons	45,639	35,869	27,046	33,042	27,914	25,206
Boards and Planks . M.	116	205	211	136	405	417
Deals. . . . . M. feet	1,294	1,534	1,061	840	1,029	956
Masts and Spars . . No.	274	450	229	154	438	75
Lathwood . . . . Cords	964	724	452	676	523	508
Shingles . . . . M.	588	1,323	995	453	838	2,352
Staves . . . . . M.	25	30	40	..	8	5
Oars . . . . . No.	883	518	756	208	36	..
Handspikes . . . No.	..	89	48	..	..	36
Dried Fish . . . Quintals	150	..	..	500	..	..
Herrings . . . . Barrels	80	13	..	..	..	41
Salmon . . . . ,,	276	138	273	552	591	565
Fish Oil . . . . Gallons	..	..	..	..	240	..
Grindstones . . . Pieces	..	244	..	..	..	..

The above Table is made up from the Custom House returns; but there is reason to believe that it by no means gives a full statement of exports arising from the fisheries. It is not unlikely that a large proportion of the fish caught and cured on the New Brunswick side of the Bay of Chaleur has been carried across the Bay to Gaspe, and shipped from thence as Canadian.

An Agricultural Society was established in this county in 1840. At the meeting called for the purpose of establishing the Society, it was resolved, "That the new county of Restigouche has been, and still continues to be, chiefly a lumbering community; that the timber trade has done much for Restigouche, has been the chief support of its inhabitants, and continues to afford a valuable article of export; but that the agricultural interests, which, from the peculiar richness of the soil, it is so admirably calculated to promote, have been hitherto much neglected; and that it, therefore, becomes necessary to give every facility, countenance, and support to this branch of industry." The proceedings of the Society have been of much interest. By the Fourth Report (published in 1844), it appears that a number of premiums were awarded for various products of the soil. The best wheat is stated to have weighed 65lbs. 6oz. per bushel; the second best, 65 lbs. per bushel: the third premium was awarded for wheat weighing 64lbs. 11ozs. per bushel. The best two-rowed barley weighed 56½lbs., and the second best 52¾lbs. per bushel: the best four-rowed barley weighed 57lbs. 5ozs. per bushel, and the second best 53½lbs. per bushel. The best Siberian wheat weighed 63¼lbs. per bushel. The best black oats weighed 42lbs. 14ozs., and the second best 42lbs. 2ozs., per bushel. The best white oats weighed 47lbs. 10ozs., and the second best 47½lbs. per bushel.

It appears that there was much competition for the premiums; and the weight of each description of grain mentioned shows clearly that Restigouche possesses capabilities for producing grain of superior quality; and that this, and the other northern counties of New Brunswick, are well calculated to become hereafter the granary of the province. As an erroneous impression has obtained that these counties, from their high northern latitude, were incapable of producing wheat, it is important that the error should be corrected as speedily as possible.

COUNTY OF GLOUCESTER.

This county is estimated to contain 1,037,440 acres, of which 332,902 acres are granted and located, and 704,538 acres are still vacant. The population in 1840 was 7751; and the quantity of cleared land, 11,681 acres. The quantity of vacant land sold in 1845 was 1721 acres.

There is much good land in the county of Gloucester, and it occupies a very favourable position as regards the fisheries of the Bay of Chaleur and the Gulf of St. Lawrence. Of late years, increased attention has been given to agriculture, and the results have fully demonstrated that the capabilities of the soil and the climate enjoyed by this county are such as to render it essentially a grain-growing district. The great weight of the wheat, and other descriptions of grain grown in Gloucester of late years, has been such as to attract public attention, and elicit expressions of surprise. The Report of the Gloucester Agricultural Society for 1843 states that, "Since

the establishment of the Society, agriculture has been gradually and steadily advancing, every succeeding year's exhibition showing a manifest improvement in the weight and quality of all descriptions of grain, until the present year, when we have numerous stocks of wheat weighing 68lbs. to the bushel, and may safely state the average weight of wheat and barley throughout the northern part of the county to be about 64½lbs. for the former, and 53lbs. for the latter, an average not surpassed in this province. The increased quantity grown of late years also affords cause of gratulation. From statistics collected by the secretary, and not yet complete, it appears that all the grain raised in the parish of Bathurst in the year 1833 did not exceed 600 bushels, while the quantity already ascertained of the crop of 1843 is beyond 7000 bushels. But, notwithstanding this gratifying state of things, your Committee must not be deemed unreasonable in stating that they anticipate much more rapid progress yet, for a few years to come. Settlers will multiply, for the excellence of our soil is becoming known and appreciated; cultivation will extend; and in corn, at least, improvement must continue through assiduity and skill, until the weight of our wheat reaches 70lbs. per bushel, our barley 58lbs. to 60lbs., and our oats 48lbs. to 50lbs., and this may be considered perfection, for it is improbable that grain, by any process, can be raised to approach nearer the density of water than wheat at the above standard; a weight, too, it has not attained in any country, except in some rare and solitary instances."

A very interesting Statistical Return of the agricultural produce of the county of Gloucester for the year 1844, made up with great ability by Henry Baldwin, Esq., high sheriff of the county, shows the following results:—

Bushels of Wheat	20,254
Ditto Oats	23,139
Ditto Barley	6,255
Ditto Peas	994
Total	52,470
Barrels of Potatoes	106,984
Ditto Turnips	1,471
Ditto other Roots	203
Total	108,658
Tons of English Hay	2,251
Ditto Marsh and Meadow Hay	925
Total tons	3,176

The valuable and highly interesting information collected by Sheriff Baldwin has been of essential service to the county of Gloucester; and it is greatly to be regretted that efforts have not been made, either by private individuals or at the public expense, to collect and compile similar information in the other counties of the province.

The principal exports of the county of Gloucester from 1835 to 1845, both years inclusive, are thus stated:—

PORT OF BATHURST.

Articles.	1835	1836	1837	1838	1839
Timber . . . . Tons	49,607	16,549	20,036	34,262	19,350
Boards and Planks . M.	393	163	164	23	..
Deals . . . . . M. feet	..	..	..	474	898
Masts and Spars . . No.	324	320	264	104	182
Lathwood . . . . Cords	1,142	367	443	698	388
Oars . . . . . No.	316	124	281	306	246
Shingles . . . . M.	..	..	..	288	138
Dried Fish . . . Quintals	5,780	1,592	770	100	680
Pickled Fish . . . Barrels	29	19	1,005	362	50
Herrings . . . . ,,	32	135	..	..	..
Salmon . . . . ,,	72	20	78	37	64
Fish Oil . . . . Gallons	719	..	..	..	..
Grindstones . . . Pieces	..	..	..	..	..

Articles.	1840	1841	1842	1843	1844	1845
Timber . . . . Tons	12,768	9,101	3,005	7,157	8,002	4,046
Boards and Planks . M.	18	..	..	..	..	..
Deals . . . . . M. feet	5,005	725	424	796	253	452
Masts and Spars . . No.	142	130	64	67	56	155
Lathwood . . . . Cords	235	157	55	125	143	67
Oars . . . . . No.	163	72	128	24	..	..
Shingles . . . . M.	603	1,699	816	1,079	390	307
Dried Fish . . . Quintals	365	..	50	..	..	..
Pickled Fish . . . Barrels	..	3	..	..	102	264
Herrings . . . . ,,	..	..	..	..	20	52
Salmon . . . . ,,	151	32	161	250	126	134
Fish Oil . . . . Gallons	990	..	..	..	1,215	..
Grindstones . . . Pieces	800	..	..	..	..	150

PORT OF CARAQUET.

Articles.	1835	1836	1837	1838	1839
Timber . . . . Tons	Included with Bathurst.	..	3,261	1,266	5,550
Deals . . . . . M. feet		..	32	6	80
Masts and Spars . . No.		..	..	..	..
Lathwood . . . . Cords		..	70	23	108
Dried Fish . . . Quintals		8,039	8,666	5,850	6,950
Pickled Fish . . . Barrels		164	78	50	30
Herrings . . . . ,,		40	4	1,770	8
Salmon . . . . ,,		23	18	4	..
Fish Oil . . . . Gallons		922	900	1,218	1,750
Oysters . . . . Bushels		2,612	..	..	..
Grindstones . . . Pieces		..	Tons 28	..	..

Articles. t	1840	1841	1842	1843	1844	1845
Timber . . . . Tons	6,983	3,625	554	6,050	7,269	5,919
Deals . . . . . M. feet	257	31	7	47	100	1,006
Masts and Spars . . No.	..	..	..	12	21	..
Lathwood . . . . Cords	153	99	15	131	171	140
Dried Fish . . . Quintals	7,923	7,770	9,038	8,670	8,841	7,456
Pickled Fish . . . Barrels	78	362	..	100	5	18
Herrings . . . . ,,	..	26	87	16	50	110
Salmon . . . . ,,	..	11	20	13	5	..
Fish Oil . . . . Gallons	..	1,038	4,178	2,905	2,579	849
Oysters . . . . Bushels	8,500 Pieces	5,000	7,000	5,290	6,000 No.	2,010
Grindstones . . . Pieces	976	2,210	4,981	900	1,721	1,510

The quantity of dried fish exported from Caraquet, of late years, has formed a very considerable proportion of the whole export of that article from the province. The fishing grounds being in close proximity to the shores of Gloucester, are much frequented by fishing-boats from Gaspe; the New Brunswick fishermen also frequently carry a portion of their fish over to Paspebiac, whence they are shipped to foreign ports.

Besides the exports mentioned, very considerable quantities of manganese have of late years been exported to England from Bathurst. At this time, an exploration for coal is going on in Gloucester, with very favourable prospects; the boring has at present reached the depth of 300 feet. The mineral wealth of this county is reported to be very considerable, but the settlements being confined almost exclusively to the coast, and the interior remaining in a state of unbroken wilderness, a perfect and thorough examination of the country cannot yet be made. Abundance of lime and marl of a yellowish white colour, strongly resembling chalk, have been found on the coast of the Bay of Chaleur, north of Bathurst, and the use of these powerful stimulants to vegetation has been attended with the most beneficial results.

COUNTY OF NORTHUMBERLAND.

With the exception of the county of Carleton, this is the largest county in New Brunswick, containing 2,980,000 acres, of which 986,168 acres are granted and located, leaving 1,993,832 acres still vacant. The population of the county in 1840 was 14,620, and the quantity of cleared land 25,323 acres, or one thirty-ninth part only of the lands granted and located, and only one hundred and seventeenth part of the area of the county. The area is equal to 4656 square miles, and the population barely exceeds three souls to each square mile.

The whole colony of Prince Edward Island contains 1,380,700 acres, or less than half the number of acres in the county of Northumberland.

There is much good land, well adapted for settlement and cultivation, in this county; but the immense quantity of fine timber within its limits, and the facilities for floating it to market were so great, as to withdraw the attention of the settlers from agricultural pursuits. To remedy this state of things an Agricultural Society was established in 1838, which presented a first Report in 1839. From this Report some extracts are given with reference to the state of agriculture and the capabilities of the county: "As to the county in which we reside, we would remark, what is generally known, that its inhabitants have been chiefly a lumbering community. The timber trade has done much for Northumberland; it has built its villages, and been heretofore the chief support of its inhabitants; and it has afforded a very valuable article of export. Unfortunately, however, it has been of far less advantage to this community than it might have been, had agriculture been more extensively prosecuted. Our forests have been a mine of wealth, but that wealth has for the most part gone to enrich other countries and communities, which have supplied us with the necessaries of life. Had one part of our population kept to the cultivation of the soil, while the

other was engaged in the manufacture of timber, much of the money that was made in the county, instead of flowing into other channels, would have remained in it, and left us in very different circumstances from those in which we now find ourselves placed. Had the farmer kept apart from lumbering entirely, or employed himself only in getting out such a quantity of timber during the winter months, as he could on his own resources, without incurring risk; and had he laid out his energies in clearing and cultivating the soil, and in endeavouring to raise supplies, not only for his own family, but as far as possible also to meet the wants of his neighbours who were engaged in the labours of the forest, he would have slowly, but surely, arrived at independence and substantial comfort. His labours, instead of being like those of the lumberman, of a transitory, would have been of a permanent description; and while they added to the real wealth of the country, would have created a valuable inheritance to transmit to his children.

"An idea long prevailed, that this could never become a farming country; that the soil was of an inferior description; and that the seasons were too short and precarious for the successful prosecution of agriculture; and it was correctly said, that provisions could be purchased cheaper than they could be raised in Miramichi. Hence the occupants of the soil, without giving their farms a fair trial, or endeavouring by industry and perseverance to overcome the difficulties incident to the settlement of a new country, thinking they had discovered a nearer and easier road to wealth than the clearing of the forest, deserted their farms and embarked in lumbering. To enable them to carry on this business extensively, they found it necessary to obtain large supplies from merchants on credit. It is needless to dwell upon the evils and abuses arising out of this system. It is sufficient to say, that from the heavy expense and great risks attendant on the manufacture of timber, the great majority of those engaged in it have become involved in difficulties, from which they have been unable to extricate themselves. Those who once engaged in this employment seldom have had the resolution to quit it, as long as it could afford them a support, however precarious:—this, at least, has been the case in Miramichi. Now, however, that the forests are so much thinned of the heavy growth of pine, the manufacture of timber cannot be carried to the same extent as in former years: very many, therefore, who have heretofore depended on it, must either quit the country or look to the soil for the means of support.

"It is well known that until lately this county had to depend on other countries for a supply of every necessary of life; and this is still the case to a deplorable extent. Even potatoes, for which our soil is so admirably adapted, were supplied to us almost wholly from the neighbouring colony of Prince Edward Island.

"Wheat is a tolerably sure crop, and where the soil is in proper condition, gives a fair return. More attention should be given to the raising of oats, which have proved to be a sure and productive crop. Barley, in general, is found to answer well in our soil."

This Report gives a statement of the quantity of provisions imported into Miramichi during the year 1838, the value of which is stated to be 102,770*l.* currency.

It is very pleasing to notice the rapid progress of agriculture in Northum-

berland since 1839. In the Report of the Agricultural Society for 1842, it is stated, " that the quantity of wheat raised in the county during the past season, was at least twice as great as that produced in any preceding year. The oat crop also was abundant, and the quality good. From the superior description of mills lately erected, the quality, both of flour and oatmeal, produced in Miramichi, has been quite equal to anything imported either from Canada or Britain. The return of potatoes last year was very abundant, and amply sufficient to supply the wants of the county. The Committee feel warranted in saying, that a marked impulse has been given to agricultural pursuits in this section of the province, by the operations of the Society; and they humbly hope that the Legislature will continue, and even increase that patronage to it and kindred institutions, which may enable them further to promote the great ends they have in view; and that the day may come when New Brunswick may be enabled to raise provisions sufficient to supply the wants of the population. Then, and not till then, can we expect the colony to attain anything like substantial prosperity and independence."

The Report of the Society for the past year (1846) has just been published; from which it appears, that the annual show took place at Newcastle, on the 7th January, 1847; and that the exhibition far exceeded any thing of the kind ever before witnessed in Miramichi; the farmers beginning to feel the benefits of the Society, and to take a livelier interest in its proceedings. A very large quantity of butter was exhibited, and premiums were awarded for the best samples in firkins of not less than 30lbs. weight. The show of grain was, by far, the largest ever exhibited, comprising sixteen samples of white wheat, weighing from 63lbs. to 67lbs. per bushel, and stated to be very superior. Seven samples of red wheat, five parcels of which weighed 66lbs., one parcel 65lbs., and another 66½lbs per bushel, all of very fine quality. Seven parcels of white oats, weighing from 41lbs. to 46lbs. per bushel, all very good; three parcels of black oats, weighing from 39½lbs. to 43lbs. per bushel; five samples of barley, weighing from 52½lbs. to 55½lbs, per bushel, very large and even; and six samples of peas, weighing from 67lbs. to 68½lbs. per bushel, large and even, and all of good quality. Two samples of timothy seed were also exhibited, the one weighing 43lbs. and the other 48lbs. per bushel.

This Report is highly creditable to the county of Northumberland, and affords the most convincing proof, not only of the progress of agriculture, but of the capabilities of its soil for producing every description of grain of the first quality, and in abundance. A very different state of things now exists in this county from that so well depicted in the Report of the Agricultural Society for 1839.

The following table of the exports of timber and the produce of the fisheries from this county, from 1835 to 1845, both years inclusive, will furnish a correct view of the great extent to which the timber trade has been carried in this part of the province, and the state of its fisheries:—

Articles.		1835	1836	1837	1838	1839
Timber	Tons	74,579	49,449	51,570	79,405	77,023
Boards and Plank	M. feet	9,906	7,739	12,092	583	623
Deals	,,	..	..	..	21,918	18,391
Masts and Spars	No.	1,267	824	1,383	1,578	1,294
Lathwood	Cords	1,676	1,099	1,193	1,649	907
Shingles	M.	972	673	1,413	1,241	1,909
Staves	M.	39	18	17	28	5
Oars	No.	1,281	927	1,359	1,913	1,407
Handspikes	No.	54	528	220	565	1,212
Dried Fish	Quintals	3,441	3,610	1,659	..	1,863
Pickled Fish	Barrels	..	..	..	..	63
Herrings	,,	12,465	8,629	..	331	2.067
Alewives	,,	..	..	3,559	3,298	2,414
Salmon	,,	717	499	1,370	703	1,129

Articles.		1840	1841	1842	1843	1844	1845
Timber	Tons	68,242	68,348	16,259	27,937	24,463	37,793
Boards and Plank	M. feet	997	333	1,415	1,222	1,135	1,664
Deals	,,	19,178	30,802	15,477	20,929	22,328	27,856
Masts and Spars	No.	1,332	484	156	281	566	570
Lathwood	Cords	1,678	1,921	551	716	831	1,123
Shingles	M.	1,806	3,399	4,357	2,772	3,504	4,154
Staves	M.	..	30	..	14	1	..
Oars	No.	1,529	1,178	200	592	506	246
Handspikes	No.	204	768	995	..	..	..
Dried Fish	Quintals	933	..	486	340	150	70
Pickled Fish	Barrels	4	40	58	70	83	368
Herrings	,,	496	140	346	219	1,080	3,732
Alewives	,,	1,089	313	1,839	866	4,333	..
Salmon	,,	1,377	1,614	2,295	1,093	1,616	1,836

The extent to which ship-building has been prosecuted in this county will be seen on reference to the return of vessels built and registered in this province, which is appended to this Report.

COUNTY OF KENT.

There is scarcely a single hill of any magnitude in the whole of this county, and the land, especially on the Gulf Shore, is very low and level. It may be described as the most level county in the province. The settlements are chiefly confined to the coast and the banks of the rivers along the tide-way, where the Acadian French, who constitute a considerable proportion of the population, reside in close proximity to each other.

The county of Kent contains 1,026,400 acres, of which 386,398 acres are granted and located, and 640,002 acres are still vacant. The population in 1840 was 7,477 souls, and the estimated quantity of cleared land, 20,413 acres. The quantity of vacant land sold in 1845 was 2,777 acres.

The quantities of timber and fish exported from this county, from 1835, to 1845, both years inclusive, are given in the following table:—

PORT OF RICHIBUCTO.

Articles.	1835	1836	1837	1838	1839
Timber . . . . Tons	17,313	25,267	16,973	16,458	15,093
Boards and Plank . M.	5,294	4,742	7,161	177	251
Deals . . . . . M. feet	..	..	..	5,959	4,987
Masts and Spars . . No.	869	455	316	285	235
Lathwood . . . . Cords	517	626	479	491	482
Shingles . . . . M.	301	125	562	87	67
Staves . . . . . M.	8	44	23	4	..
Oars . . . . . No.	318	388	114	262	90
Dried Fish . . . Quintals	..	..	..	6	..
Herrings . . . . Barrels	917	300	255	..	..
Alewives . . . . ,,	..	..	..	102	20
Salmon . . . . ,,	..	..	..	..	1
Oysters . . . . Bushels	..	..	..	..	..

Articles.	1840	1841	1842	1843	1844	1845
Timber . . . . Tons	16,957	13,935	11,463	7,153	7,157	6,072
Boards and Plank . M.	213	460	1,061	1,000	912	902
Deals . . . . . M. feet	4,404	3,962	2,455	3,215	4,261	6,286
Masts and Spars . . No.	243	89	487	242	95	199
Lathwood . . . . Cords	557	353	262	206	205	219
Shingles . . . . M.	317	256	1,531	1,107	826	489
Staves . . . . . M.	15	1	..	..	9	..
Oars . . . . . No.	72	80	277	..	..	..
Dried Fish . . . Quintals	..	..	..	..	40	..
Herrings . . . . Barrels	..	..	..	100	..	40
Alewives . . . . ,,	..	..	..	..	79	..
Salmon . . . . ,,	..	20	..	107	137	77
Oysters . . . . Bushels	..	..	..	3,000	8,000	6,075

As the county of Kent possesses several good harbours on its coast, and is in other respects well situated for prosecuting the fisheries in the Gulf of Saint Lawrence, the small amount of exports arising from the fisheries is somewhat striking, and shows that something is wanting to give an impetus to this branch of industry.

The lands already settled in Kent are of good quality, and much yet remains vacant, equally good, and well adapted for the culture of grain and potatoes. The Agricultural Society of this county has of late years used strenuous exertions to improve the mode of farming. The Report for 1842 states that preparations were made in that year to bring a much larger quantity of land under cultivation than in any previous year, and in most instances, the expectations of the farmers were fully realized. The best wheat exhibited at the show of that year weighed 70lbs. per bushel, the best barley 56lbs., and the best oats 48lbs. per bushel, fully proving the capabilities of this county for growing the different kinds of grain.

COUNTY OF WESTMORLAND.

In 1845 the county of Westmorland was divided into two separate counties, that part lying south and west of the river Petitcodiac being erected into a new county, by the name of Albert. The area of the present county of Westmorland is 878,440 acres, of which 577,440 acres are granted and located, leaving only 301,000 acres of vacant land.

The population of Westmorland, at present, is estimated at 18,360 souls; and the area of the county being equal to 1372 square miles, the proportion of population exceeds thirteen souls to each square mile.

This is eminently an agricultural and grazing county, as the abundance of rich compost, and the extensive dyked marshes within its limits, teeming with inexhaustible fertility, offer the greatest means and facilities for growing every description of agricultural produce, and for grazing and feeding stock. In 1840, the county of Westmorland (including the present county of Albert) numbered no less than 3,421 horses, 20,754 head of neat cattle, and 27,553 sheep, besides 16,545 swine. The increase of stock has since been very considerable, but no data exist from which to compile an accurate account. Although very large quantities of butter are annually sent to market from Westmorland, yet there is reason to believe that the dairy capabilities of this county are as yet only beginning to be developed. The introduction of capital and labour, with skill and science, would tend greatly to develope fully the numerous and abundant resources of Westmorland, and would undoubtedly render this county one of the finest districts in all British North America, for grazing purposes, and for the pursuits of agriculture generally.

The science of agriculture has made very considerable advances, under favourable circumstances, in that part of Westmorland known as the parish of Sackville, where the proprietors of farms are reaping the rich reward of their skill and industry. Among the numerous Acadian French inhabitants in the parish of Dorchester, on the fertile banks of the Memramcook and Petitcodiac rivers, an onward movement has been commenced through the exertions of the Reverend Ferdinand Gauvreau, their pastor, who, at his own expense, has not only imported some of the latest and most improved agricultural implements, and put them in actual use, but has also, by precept and example, endeavoured to induce his parishioners to adopt improved modes of farming and feeding stock. If this class of inhabitants can be induced to depart from the mode of cultivation introduced by their forefathers, and followed without deviation from generation to generation, it will materially increase the wealth and advance the prosperity of Westmorland.

Of the products of this county, a large proportion is sent to Saint John, and passed over to Nova Scotia, without any account being taken of the quantities.

The following Table of exports from Dorchester is given, with the view of showing the increase of trade of late years, and not as giving an accurate statement of the exports of the county:—

Articles.	1835	1836	1837	1838	1839
Timber . . . . Tons	400	2,316	27	628	384
Boards and Planks . M.	830	201	602	16	110
Masts and Spars . . No.	7	6	152	5	5
Deals . . . . . M. feet	..	..	..	32	479
Lathwood . . . . Cords	17	39	9	18	3
Shingles . . . . M.	..	..	..	..	..
Staves . . . . . M.	5	11	7	2	16
Dried Fish . . . Quintals	..	..	..	..	..
Herrings . . . . Barrels	917	..	..	..	..
Salmon . . . . . ,,	..	..	..	..	..
Shad . . . . . ,,	..	..	..	..	..

Articles.		1840	1841	1842	1843	1844	1845
Timber	Tons	1,003	3,949	3,009	3,972	1,827	3,752
Boards and Planks	M.	..	..	201	85	..	375
Masts and Spars	No.	11	58	404	58	1,999	..
Deals	M. feet.	490	603	994	1,017	1,156	2,184
Lathwood	Cords	24	88	49	43	36	72
Shingles	M.	..	..	40	..	..	..
Staves	M.	5	19	23	7	20	14
Dried Fish	Quintals	20	..	..	..	..	..
Herrings	Barrels	120	..	..	..	..	..
Salmon	,,	..	2	1	..	..	..
Shad	,,	..	2	276	..	..	..

The number of vessels cleared outwards from the port of Dorchester, for the years mentioned, is thus stated:—

	Vessels.	Tons.	Men.
In 1842	23	4068	169
1843	20	4253	166
1844	22	3528	156
1845	25	6539	247

During the past year (1846), the vessels which loaded at Shediac have cleared at the port of Dorchester, and the return stands thus for three quarters of the year ending 10th October, last:—

	No. Vessels.	Tonnage.	Men.
To Great Britain	13	5,285	182
To Ireland	17	4,759	173
Totals	30	10,044	355

The exports the past season from Dorchester and Shediac consisted of white and red pine timber, birch timber and planks, larch timber, railway sleepers, scantling and treenails, spruce deals, battens, oar rafters, spars, small poles, scantling, boards and plank, hemlock lathwood, pine boards and plank, laths and sawed palings, and ash hogshead staves, all for the United Kingdom.

During the last few years the shad fishery has been prosecuted to a considerable extent on the river Petitcodiac, as well as at Sackville, and has proved very profitable to those engaged in it. In the season of 1846, there were 200 boats engaged in taking shad on the Petitcodiac, each boat having two men. 160 of these boats were fitted out and manned by the Acadian French, and the remaining forty boats by English settlers. The catch of each boat averaged twelve barrels of fish, although some boats took upwards of twenty barrels. These quantities are over and above what were consumed fresh, of which an estimate can scarcely be formed; the quantity must be very large, however, as fresh shad are said to constitute a principal portion of the food of the inhabitants during the summer.

The quantity of shad now caught and cured annually at Dorchester and Sackville has been estimated at 3000 barrels, the market value of which was 5000*l*. This fishery may be prosecuted to a still greater extent, and is well worthy of encouragement.

The ledges of sandstone at Cape Marangum furnish grindstones of superior quality, and the business of making them is prosecuted to some extent. A number of persons engaged in making grindstones reside on the Cape, and each man makes on the average 400 stone, by measurement, during the season. The "stone," by measurement, is two feet in diameter

and four inches thick, the value of which at the Cape is two shillings, or a little more. The grindstones, when made, are principally brought by persons from the opposite shore of Nova Scotia, at the South Joggins, and shipped to the United States, where they are in high repute, and extensively used for grinding and polishing tools and cutlery. The largest grindstone made at the Cape the past season, was six feet and a half in diameter, and twelve inches thick. The whole quantity made annually does not fall far short of 18,000 stone, by measurement, and the quantity may be increased to any desired extent, as the ledges are extensive, and seem to be almost inexhaustible.

At Grand Ance, to the northward of Cape Maranguin, there is an extensive deposit of gypsum close to the shore, and superior flag-stones have been shipped from a quarry near the gypsum.

The project of connecting the Bay of Fundy with the Gulf of Saint Lawrence, by means of a canal, having been for the present abandoned, a railway for effecting that object has been proposed. As this railway would, to a certainty, intersect the trunk railway from the Atlantic to Quebec, should such be established, and would lead to a more extensive prosecution of the fisheries in the Gulf of Saint Lawrence, as well as a large and increasing trade and intercourse with Prince Edward Island, the proposal is worthy the most serious consideration. Without adverting to the advantages that would necessarily arise from this railway forming branches of the trunk railway, which would be matter for future consideration, it becomes, in the first place, necessary to indicate the most eligible line of country, with the best port, as well on the Gulf shore, as on the Bay of Fundy.

The Honourable Captain Owen, R.N., states that Dorchester, if ever adopted as a commercial port, has many great and important advantages, which no other place in its vicinity can ever obtain. There is never less than five fathoms water near Dorchester Island at low tide; and it is in fact the only ship harbour in this part of the Bay of Fundy where vessels can load at all times with perfect safety and facility. During the past season a steamer has run from this place to St. John, and made the trips regularly in 11 and 12 hours.

The distance from Dorchester Island to Shediac Harbour (at the mouth of the Scadouk river) was ascertained to be 25¼ miles, by the survey of Captain Crawley, R.E. That officer commenced his survey at the bridge over the Scadouk river, near its mouth, and proceeded one mile and half up the Scadouk river, to a small brook called Underwoods; thence in a south-westerly direction, crossing the low lands through which the Scadouk winds its course to the Memramcook river; thence more southerly, following the general course of the Memramcook, to Dorchester Island. Whatever obstacles may exist on this route to prevent a canal being made, there would seem to be none to prevent the establishment of a railway. The dyked marshes in the valley of the Memramcook would afford a dead level for more than one-third the whole distance, while the valley of the Scadouk offers a level plain for another third of the route. The intermediate distance between these two valleys is not by any means an elevated country, not sufficiently so even to prevent a canal being made at moderate expense, had there been a sufficient supply of water on the summit level.

The following estimate of the probable average cost, in the province New Brunswick, of one mile of wooden railway, the wood prepared l "Payne's Process," was published in the "Royal Gazette" of the 24 December, 1845:—

	Currency.			Sterling.		
	£.	s.	d.	£.	s.	d
To clearing and stumping one mile in length, by 50 feet in width, of wilderness land	158	0	0	125	0	0
The average cost of bridging and viaducts, deduced from 150 miles through the province of New Brunswick	110	0	0	91	13	4
Grading and levelling	1,500	0	0	1,250	0	0
Cutting and hewing 2,112 sleepers of spruce or hemlock, 8 feet long, and 9 inches square, equal to 237½ tons of 40 cubic feet, at 4*s.*	47	10	0	39	11	8
Hardening the above by "Payne's Process," equal to 190 loads of 50 cubic feet, at 20*s.*	190	0	0	158	6	8
Cutting and squaring 812 trams or rails of beech, birch, or maple, 13 feet long and 6 inches square, equal to 66 tons of 40 cubic feet, at 5*s.*	16	10	0	13	15	0
Hardening the above by "Payne's Process," equal to 53 loads of 50 cubic feet, at 20*s.*	53	0	0	44	3	4
212 iron screw bolts and nuts	20	0	0	16	3	4
To framing, trimming, and laying 320 rods of railway, at 30*s.*	480	0	0	400	0	0
	£2,567	0	0	2,139	3	4
20 per cent. for expense of engineering and contingencies	513	8	0	427	16	8
Cost of one mile	£3,080	8	0	2,567	0	0

The foregoing estimate is founded on authentic information, and the current rates of country. It has been ascertained, by actual survey, that the very worst grades, in a *direct* rou and confined to a limited extent of country, do not exceed one in fifteen, and they are, in m cases, easy of reduction, while the greater portion is ascertained to be very favourable. It m also be recollected that from the abundance of timber on the spot, an immense saving may, many situations, be made, by substituting substantial wooden structures in lieu of embar ments, &c. The purchase of valuable property, which in this country may be safely considered a part of the contingent account, does, in some districts, most materially augment railw estimates.

JOHN GRANT, *Civil Engineer*

It may be remarked, that a railway could be constructed on wood up the dyked marshes, along the valley of the Memramcook, much bel this estimate. In the dyked marshes wood never decays, and is n liable to be thrown out of its place or upheaved by frost, which are ve important points.

With reference to the harbour of Shediac, the following information h been obtained from the most authentic sources, and from perso observation.

Captain Bayfield, R.N., Marine Surveyor in the Gulf of St. Lawren in a letter dated 25th January, 1841, states as follows:—"Shediac is t only harbour of New Brunswick, eastward of Miramichi, which a vessel distress could safely attempt to enter in heavy northerly gales, its e trance being less difficult and dangerous than that of any other on t coast." By Captain Bayfield's observations, Shediac Island is in latitu 46° 15′ 15″ north, and longitude 64° 32′ 10″ west; longitude in tim 4h. 18m. 8·40s.; variation of the compass, 19° west.

Those well-known and most intelligent pilots at Shediac, Messrs. Jam and William Milne, state that during the summer solstice the time

high water at the full and change of the moon is 7 A. M.; and during the winter solstice at 12 noon. The vertical rise of a medium spring tide they state to be from three to four feet, and the neaps, from one and a half to two and a half feet. In the fair way or ship channel, at the distance of two and a half miles from the harbour, twenty-five feet of water is to be found, which is continued up to the entrance of the harbour with little variation; from thence there is nineteen to twenty feet in the channel, gradually lessening until off the anchorage of Point Du Chêne, where sixteen and a half feet will be found at one-third of a mile from the shore. The anchorage is good all over the fair-way to the northward and westward of the Medea Bank, in blue clay, with three to five fathoms water. Vessels discharging ballast lay in sixteen feet water, off Point Du Chêne, alongside a bank upon which there is only three to five feet water, and cast out their ballast in tubs. The Messrs. Milne further state, that they have taken loaded vessels safely out of Shediac harbour drawing eighteen feet water; and that there is only fourteen feet water to be relied upon at Cocagne, and eleven and a half feet at Buctouche.

During the season of 1846 ten ships and brigs, in all 4546 tons, loaded at Shediac with timber, deals, and railway sleepers, for ports in England and Ireland. A number of schooners also sailed for St. John's, Newfoundland, with boards. Two packets ply regularly every week to Bedeque, Prince Edward Island: and it is proposed to run a steam-boat next season to Bedeque and Charlotte Town regularly.

As a communication by railway between Dorchester and Shediac, and a communication thence by steamers to Prince Edward Island, would cause a large portion of the agricultural exports of that fertile island to be sent over by such communication to Dorchester, to be shipped from thence to a market, it becomes important to inquire into the value and character of the imports and exports of the island.

The following account shows the total value of imports, distinguishing each port in the island, for the year ending 5th January, 1846:—

Ports	From Great Britain.	British West Indies.	British North American Colonies.	Foreign Countries.	Total. Sterling.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Charlotte Town	39,487 1 10	1,049 10 11	58,444 15 8	2,753 8 4	101,739 16 9
Bedeque . .	204 0 1	..	1,497 13 0	..	1,701 13 1
Malpeque . .	5,169 15 10	..	3,039 1 6	..	8,208 17 4
Three Rivers .	..	..	6,282 8 8	45 0 0	6,327 8 8
Cascumpec . .	..	..	790 9 8	..	790 9 8
Colville Bay .	..	..	3,169 11 10	..	3,169 11 10
Total . .	44,860 17 9	1,049 10 11	73,224 0 4	2,803 8 4	121,937 17 4

The following account shows the value of exports, distinguishing each port in the island, for the year ended 5th January, 1846: —

Ports.	To Great Britain.	British West Indies.	British North American Colonies.	Foreign Countries.	Total. Sterling.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Charlotte Town	10,120 11 7	1,229 0 2	20,044 7 9	2,853 2 0	34,247 1 6
Bedeque . .	2,830 16 6	..	5,770 2 5	..	8,600 18 11
Malpeque . .	3,622 13 7	..	4,475 15 0	..	8,098 8 7
Three Rivers .	4,809 4 1	..	6,696 17 1	212 8 0	11,918 9 2
Cascumpec . .	129 14 0	..	1,688 10 6	..	1,818 4 6
Colville Bay .	..	..	5,521 9 6	..	5,521 9 6
Total . ..	17,512 19 9	1,229 0 2	44,397 2 3	3,065 10 0	70,204 12 2

It will be observed that nearly two-thirds of all the imports of the island are drawn from the other North American colonies, and that the same proportion of its exports are sent to the same colonies. The imports consist principally of British manufactured dry goods, coals, iron, cordage, sail-cloth, soap, salt, stationery, nails, tea, tobacco, wines and spirituous liquors, sugar, and molasses. The following is an account of the quantities of agricultural produce and stock exported in the year ending the 5th January, 1846, and the products of the fisheries:—

Wheat	Bushels,	2,030	Beef	Tierces,	61
,, Flour . . .	Barrels,	374	,, ...	Cwt.	25
Barley	Bushels,	20,822	Butter	Firkins,	11
Oats	,,	227,760	,, ...	Cwt.	1
Oatmeal	Barrels,	572	Cattle	Head,	389
,, ...	Bags,	288	Horses	,,	16
,, ...	Cwt.	52	Sheep	,,	656
Potatoes	Bushels,	227,731	Pigs	,,	75
Turnips	,,	9,694	Dry Fish	Quintals,	3,425
Pork	Barrels,	259	Pickled Fish	Barrels,	987
Beef	,,	89			

In the year 1845 the number of vessels launched and registered in the island was 88, with a total of 9649 tons; and certificates previous to registry were granted for four other vessels, with a total of 664 tons, making in all 92 vessels, 10,313 tons. The number and tonnage of vessels belonging to the island, engaged in the foreign and coasting trades in 1845, was as follows:—

Foreign trade	38 vessels,	7,352 tons.
Coasting trade	233 ,,	9,636 ,,

Twenty-three fishing passes were granted to small vessels in the year 1845.

A census of the island was taken in the year 1841, from which it appears, that the whole population then amounted to 47,034 souls. The number of acres of arable land is returned as 141,560. The crops of the year 1840 are thus stated:—

Wheat . . .	bushels,	153,459
Barley . . .	,,	83,299
Oats	,,	611,824
Potatoes . . .	,,	2,250,114

The quantity of stock on the island, in 1840, is thus stated:—

Horses	9,861
Neat Cattle	41,914
Sheep	73,643
Hogs	35,521

If facilities were created for transporting the surplus produce of Prince Edward Island to Shediac, and thence to Dorchester for shipment, a certain market could always be found for such produce at remunerating prices, and the imports of the island would find their way there by the same channel. The exceeding fertility of the island, and its capabilities for producing grain and potatoes to an immense extent, are well known facts; and it needs only a steady market to increase its population and its products, and render it a wealthy and flourishing colony.

The port of Shediac is well adapted as a station for carrying on the fisheries in the Gulf of St. Lawrence, at the Magdalen Islands, and on the coast of Labrador; yet only one small vessel was fitted out there for these fisheries during the past season. A fishing-vessel was fitted out last spring at Campo Bello, for the Labrador Fishery, and on the voyage to the south-eastward of Shediac took 100 barrels of spring herrings. This vessel put into Shediac, sold the herrings, procured a fresh supply of salt, and sailed for Labrador, where a full fare of fish was taken. At the end of the season this vessel returned to Campo Bello, after having made a very profitable voyage. The long voyages to and from Campo Bello must have been a great drawback; and this case is mentioned to indicate the advantages of fitting out such vessels at Shediac, if a railway, or other ready communication, existed between the Bay of Fundy and the Gulf of St. Lawrence.

It only remains to mention that some very superior steam saw mills have recently been erected at the mouth of the Scadouk river, in Shediac harbour; and that very extensive water power for manufacturing purposes exists on the Scadouk and Shediac rivers, at the head of the tide on each river, and within short distances of the harbour of Shediac. A quarry of sandstone, of superior quality for grindstones, has recently been opened on the Scadouk river, which is about to be worked; an out-cropping of coal has also been noticed on this river, as also at Tedish river, to the southward of Shediac, but no examinations have yet been made to ascertain the existence of large deposits of this valuable mineral.

COUNTY OF ALBERT.

Up to the year 1845 this new county formed part of Westmorland, as stated in the preceding notice of that county. The area of Albert county contains 433,560 acres, of which 233,700 are granted and located, and 199,680 acres remain ungranted and vacant. The present population is estimated at 5,660, and the quantity of cleared land upwards of 25,000 acres.

This county contains much good land, and excellent dyked marshes of considerable extent. A large proportion of the vacant land is of good quality, well adapted for settlement and cultivation, offering many advantages to settlers. The settlement formed by St. John mechanics, in 1842, on the Pollet River, and since called the "Mechanics' Settlement," is in Albert county. It is now in a flourishing condition, needing only good roads to cause its rapid advancement, very considerable progress having been made by the settlers, under very discouraging circumstances.

The resources of Albert county consist of timber and lumber, agricultural produce, fish, gypsum, grindstones and freestone. The timber of various

kinds is generally shipped on the Petitcodiac river, and shipped as from the port of Dorchester. The sawed lumber is sent to St. John generally for a market, as also the surplus agricultural produce. Owing to the recent organization of this county no Agricultural Society has yet been established, nor can any account be given of its exports.

A large deposit of gypsum, of the best quality, exists in the parish of Hopewell; and freestone and building stone are shipped from Grindstone Island.

There are quarries at Mary's Point, opposite Grindstone Island, of dark red freestone, of very fine grain, and easily worked. It may be obtained in blocks of the largest size required for building purposes. This stone has been highly approved in New York; it has been analyzed by a celebrated American professor, and pronounced equal, if not superior, to the well known freestone of Connecticut. The stone procured above the tide is very compact, smooth-grained, and entirely free from defects, and has been found to resist the influence of the atmosphere and frost as well as any freestone in North America.

The shad fishery is prosecuted by the inhabitants along the bay shore, which bounds the county on the south.

The following extract of a letter from the Honourable Captain Owen, R.N., to his Excellency the Lieutenant-Governor, dated 8th December, 1845, is here given, as it embraces various points of interest with reference to the new county:—"It is known that from the *débouche* of Petitcodiac River, at Folly Point, (very near, and immediately opposite, and south-west from Dorchester Island,) the opposite shore of Albert, all the way down to New Horton, or nine or ten miles, is covered by a mud flat, which renders it most inconvenient for water communication; and no part of it offers a point where even landing can be conveniently effected for any considerable time, or more than two hours from high water, and not one spot that can be considered a port or harbour at all.

"It is very true that a ship may lie at anchor in Five Fathom Hole, near Grindstone Island, and so she may in any part of the sea approach to Cumberland or Westmorland, even as low as Cape Enrage, and Apple River, and thence all the way up to Dorchester Island, and even a few miles up the Petitcodiac above the Ferry, and it appears to me that no one point of the coast-line affords a convenient spot for continued and uninterrupted intercourse by water, all the creeks and rivers being absolutely dry three-fourths of every tide.

"In choosing a site for the county town of Albert, I am of opinion, that we should not for any partial interest or policy lose sight of the great principle, viz.,—'that facilities of external intercourse do best promote the real interests of any local community, in peaceable relations with their neighbours.'

"The present ferry between Ferry Point and Dorchester Island, (the latter being a terminus of the great road of communication with the eastern section of the county of Westmorland, and with Nova Scotia,) has been adopted practically, as the most convenient place on the side of Albert, for maintaining most efficaciously this intercourse, and it would seem to have been adopted, because found practically to be the most convenient. The *Point, therefore, is, in my opinion,* the most suitable for the county town, *and from thence a road will,* ere long, be opened across the country,

which would materially shorten and facilitate the communication with St. John.

"At the most convenient point for ferry communication, improvements might be made by legislative aid and enactment, to render the passage across (about three miles) to Dorchester Island, available at all times of tide, and a steam ferry might be established there; and to the improvement of that point for the purpose of facilitating convenient intercourse, it should, I conceive, be the first object to which to direct the energies of the new county of Albert, to which nothing can more contribute than to keep them under the eye and immediate regards of all their local authorities, and in which their locomotive facilities and conveniences are so intimately connected.

"The part of the river between Ferry Point and Dorchester is unquestionably the best and most convenient anchorage above Grindstone Island, as your Excellency might have observed of the Columbia's anchorage, on your late visit to Albert; she never had less than five fathoms of water at low tide; and Dorchester, if ever adopted as a mercantile port, has many great and important advantages, which no other place in its vicinity can ever obtain.

"The river (so called) of Shepody, and Five Fathom Hole, can never become a place of any general importance or utility, and all intercourse with the shore is precluded for nearly three-fourths of the time; and a ferry from them must either go to Dorchester, nine or ten miles, always against a strong counter-tide going or returning, or to Point Maranguin, four or five miles, with similar inconvenience; and then the high road to Nova Scotia, through Westmorland, would require to be brought to the same point, which, after the best arrangements, would not be so convenient as the ferry between Dorchester Island and Ferry Point now is. In my opinion, there is not a point on the whole sea-coast of Albert, northward of Cape Chignecto, more objectionable for the site of a county town for Albert, than the (so-called) Shepody river."

With reference to a new line of road from the county town of Albert to the city of St. John, alluded to by Captain Owen, it may now be stated, that by an exploration recently made eastwardly from the Mechanics' Settlement, it has been ascertained, that the prolongation of the main road which passes through that settlement on a due east course, will strike the new county town, and will shorten the present road to it by at least twenty miles. If the road through the Mechanics' Settlement be prolonged westwardly through the Baskin and Donegal Settlements, along bye-roads now opened to the Dutch Valley, and thence follow the new line of great road to St. John, by way of Loch Lomond, the whole distance between the county town of Albert, and the city of St. John will be shortened at least thirty-five miles. By the establishment of this line, as that of the great road of the county of Albert, great benefits would be conferred on that county, a number of new settlements, now languishing for the want of roads, would immediately become populous and thriving, while a large quantity of vacant land of superior quality would at once be brought into request for settlement and actual cultivation.

If it be determined to try the experiment of settling new land by emigrants or others, upon the principle of making a portion of the land pay the expense of making roads through it, no line of country in New

Brunswick, at the present moment, would seem to offer so favourable an opportunity of giving the scheme a full and fair trial, as this line from St. John to Albert.

CITY AND COUNTY OF ST. JOHN.

The number of acres in this city and county is 414,720, being the smallest quantity in any county in the province. The quantity of granted and located land is 309,147 acres, leaving only 105,573 acres vacant, situate chiefly at the extreme eastern and western limits of the county. The quantity of vacant land sold in 1845 was 3859 acres. The population of the city of St. John in 1840 was 20,716, but the populous suburb of Portland would add at least 5000 to the number. The population of the city and the suburb of Portland may now be safely estimated at 30,000, and the rest of the county at 8000 souls, in all 38,000 souls, equal to one-fifth the whole population of the province.

As the county of St. John stretches along the northern shore of the Bay of Fundy for nearly ninety miles, and is just of sufficient breadth to include those elevated ridges of primary rocks which give such a forbidding aspect to the coast, it cannot be expected that much good land would be found within its limits. Yet in the valleys and less elevated parts of the county, the soil, although not of the best description, produces good crops of oats, potatoes, and turnips, while considerable advance has been made in the culture of wheat. The Agricultural Society of the county are using their best endeavours to induce the farmers to avail themselves of the advantages afforded by the vicinity of a large town, and the abundance of lime for making compost. At the Society's annual fair in October last, three samples of wheat, the growth of the county, were exhibited; one sample weighed 64 lbs., and the other two, 63 lbs. per bushel. Twenty samples of oats were exhibited, all weighing above 40 lbs. per bushel; the two best samples weighed 47 lbs. per bushel. Some very excellent samples of turnips were exhibited, and the produce of the fields where they were grown was stated to be at the rate of 800 bushels per acre.

The city of Saint John draws largely upon the counties of King's, Queen's, and Westmorland, for supplies of beef, pork, mutton, butter, and, all descriptions of agricultural produce. The establishment of railways throughout the province would enable the farmer in the most distant situations to participate in the steady markets, not only at St. John, but at Miramichi, St. Andrews, and the other seaports of the province. The trade of those seaports also would be increased by facilities of communication with the interior, and by the trade arising from the various products of the soil, which could be readily and cheaply transported to the coast for shipment. The country, instead of remaining to a great extent, in a state of almost unbroken wilderness, would soon be covered with an industrious, thriving, and numerous population; large towns would spring up at all the available ports of shipment, and manufacturing villages would be established near the railway stations, and upon the banks of the numerous rivers and streams in the province, which, from their character, furnish such an extraordinary extent of water-power, cheaply obtained, and existing for ever.

The principal exports of the port of St. John from 1819 to 1825, and

from 1835 to 1845, are given in the following Table. From 1825 to 1835, the returns of exports include St. John and out-ports, and it is not now possible to separate the accounts so as to exhibit the trade of St. John only :—

Articles.	1819	1820	1821	1822	1823	1824	1825
Timber . . . . Tons	247,894	207,899	262,597	86,642	76,583	114,116	175,360
Boards, Planks, and Deals . . . . M.	26,545	20,970	25,216	8,277	10,732	11,534	13,239
Masts and Spars . . No.	6,232	8,001	6,653	2,417	2,185	1,918	4,620
Lathwood . . . Cords	6,099	5,039	7,260	10,047	1,108	1,435	1,037
Shingles . . . . M.	6,616	11,682	18,249	2,842	1,041	491	580
Staves . . . . M.	5,850	6,837	6,023	2,392	1,664	1,923	812
Oars . . . . . No.	10,910	14,114	8,379	Ft.59,285	No. 1,556	2,103	2,902
Handspikes . . . No.	15,871	9,405	4,967	7,933	4,271	595	2,756
Hhds. Shooks . . No.	19,890	12,958	5,614	268	284	4,461	..
Dried Fish . . . Quintals	40,073	49,063	45,895	20,817	14,260	15,102	26,948
Pickled Fish . . . Barrels	..	..	..	5,840	..	9,868	8,559
Herrings . . . . Barrels	11,436	6,243	12,508	..	8,691	..	..
Smoked Fish . . . Boxes	..	..	..	548	6,861	6,961	380
Salmon . . . . Barrels	362	372	836	..	..	..	..
Ditto, Smoked	..	..	..	2,271	..	3,662	..
Fish Oil . . . . Barrels	523	564	453	216	186	168	380

Articles.	1835	1836	1837	1838	1839
Timber . . . . Tons	101,322	92,573	90,916	92,713	91,750
Boards and Plank . M. feet	32,000	33,421	36,286	4,124	5,469
Deals . . . . . M. feet	..	..	..	28,100	46,181
Masts and Spars . . No.	1,737	1,736	1,854	1,056	1,633
Lathwood . . . . Cords	1,034	1,023	963	1,182	1,217
Shingles . . . . M.	1,166	2,145	2,325	1,908	1,467
Staves . . . . . M.	738	633	666	302	68
Oars . . . . . No.	5,072	3,560	3,537	5,236	4,676
Handspikes . . . No.	1,298	836	768	300	406
Dried Fish . . . Quintals	11,327	12,702	16,279	8,694	14,071
Pickled Fish . . . Barrels	3,170	2,619	2,414	3,239	1,267
Herrings . . . . Barrels	11,579	8,451	1,042	1,539	3,864
Alewives . . . . Barrels	..	..	5,384	3,814	5,295
Smoked Fish . . . Boxes	5,483	5,880	11,915	14,121	13,391
Salmon . . . . Barrels	..	..	99	..	81
Ditto . . . . . Kitts	..	..	120	8,261	5,600
Ditto Smoked	9,404	6,944	6,073	..	10,201
Fish and Whale Oil . Gallons	140,644	77,013	208,797	211,943	104,290

Articles.	1840	1841	1842	1843	1844	1845
Timber. . . . . Tons	109,526	85,864	63,881	105,924	113,688	162,000
Boards and Plank . M. feet	3,057	2,513	4,750	6,231	5,692	7,026
Deals . . . . . M. feet	48,755	41,324	37,877	56,413	79,297	84,000
Masts and Spars . . No.	1,232	2,117	1,460	1,498	2,383	1,565
Lathwood . . . . Cords	933	1,157	1,008	1,496	1,515	2,077
Shingles . . . . M.	1,277	1,526	1,409	1,125	1,484	1,059
Staves . . . . . M.	51	46	190	30	10	20
Oars . . . . . No.	4,006	9,607	6,400	3,703	2,511	1,912
Handspikes . . . No.	242	2,084	100	1,466	173	508
Dried Fish . . . Quintals	7,441	5,797	6,062	1,810	3,374	1,316
Pickled Fish . . . Barrels	279	57	64	206	139	313
Herrings . . . . Barrels	706	1,671	1,177	723	604	1,280
Alewives . . . . Barrels	4,666	6,805	8,050	11,303	11,817	9,551
Smoked Fish . . . Boxes	22,275	19,534	7,157	5,389	7,308	10,058
Salmon . . . . Barrels	..	8	129	140	4	8
Ditto . . . . . Kitts	2,276	2,653	1,232	155	5,430	1,261
Ditto Smoked	1,059	4,853	1,858	900	306	80
Fish and Whale Oil . Gallons	162,317	119,936	205	83,418	1,884	77,294

By the foregoing Table, it will be seen, that the export trade of St. John is large, and steadily on the increase. As the outlet of the extensive river St. John, and its numerous tributaries, with a harbour never impeded by ice, the city of St. John must always be a place of considerable importance, and one which is sure to increase as the interior of the country becomes settled.

The number of new ships launched and registered at the port of St. John, during the last twenty-one years, will be found in the accompanying return; and it will thereby be seen, that ship-building has been an important branch of business. The superior steam saw mills in St. John and its vicinity, supply a large proportion of the spruce deals now shipped from the port; and that branch of manufacturing industry increases annually. The manufacture by steam power, of pine clap boards and shingles for the markets of the West Indies and the United States, has recently been commenced, and bids fair to be successful. The several iron foundries, (at which steam engines are also made,) the grist mills, tanneries, and breweries in St. John, are on a respectable scale, and all of them employ steam-engines in their several operations. There are also in St. John numerous workshops for blacksmiths, boat-builders, carriage-makers, sail-makers, riggers, carpenters, joiners, tailors, shoemakers, painters, cabinet-makers, bakers, and a variety of other mechanics and tradesmen. It is matter of regret that no effort has yet been made to ascertain the condition of these several branches of industry, the number of persons employed, or the value of the manufactured articles they produce.

As the commercial capital of New Brunswick, with a port open at all seasons of the year, the city of St. John would naturally appear as the terminus of several railways, extending throughout the province in all directions. A line of railway from St. John to Fredericton, and thence to the Grand Falls, on the western side of the St. John, has already been projected, and an Act of Incorporation has been obtained, which awaits the Royal Assent; but as no preliminary survey or exploration of the intended route has yet been made, no information can be offered on the line of country to be traversed.

Another railway from St. John to the westward, will, at a future day, be of importance, and a project for establishing such a line has already been some time under consideration by persons largely interested in the wilderness lands of Charlotte county, and of the western parts of St. John and King's Counties. But the line of railway, which, in all probability, will hereafter become of the greatest importance to St. John, would be one extending to the eastward, through the fertile vale of Sussex, to Shediac in Westmorland, and thence along the northern coast of the province to its utmost limits. Such a railway would connect the port of St. John, which is always open, with the richest agricultural and mineral districts of New Brunswick; it would transport their abundant products to the place of shipment, and a market; the salt and gypsum of Sussex and Studholm would be rendered valuable, and the immense deposits of iron ore in Springfield would be brought into profitable working. The coal mines of Queen's County would become of the utmost consequence for smelting the iron ore, for working the line, and furnishing traffic in its transport to all parts of the country. A considerable proportion of the trade of Prince

Edward Island, and of the northern portion of New Brunswick, both import and export, would pass over the railway, as would also the products of the fisheries in the Gulf, which might then be safely prosecuted to an almost unlimited extent.

In the absence of precise statements as to the value and extent of the numerous elements of wealth existing in the districts mentioned, few but such as have visited those districts, and ascertained the abundance of their resources in timber, coal, iron, salt, and various products of highly fertile soils, can form any just idea of the tide of riches which their development would pour in upon the city of St. John, or the immense influence which a railway would exercise in producing that development. To a large and valuable portion of New Brunswick this line of railway would be of paramount importance, and the various matters connected with it are suggested as fitting subjects for further inquiry.

COUNTY OF CHARLOTTE.

This county occupies the south-west angle of New Brunswick, and is the last of the maritime counties which remains to be noticed. It contains 783,360 acres, of which 317,245 acres are granted and located, leaving 466,115 acres still ungranted and vacant. The population of the county in 1840 was 18,178, and the estimated quantity of cleared land, 35,135 acres. The quantity of vacant land sold in 1845 was 3,786 acres.

Charlotte may be described as a hilly country, with ridges of granite rocks along its northern boundary. Yet there is much good land in the county, especially in the valleys of the numerous rivers which intersect it in all directions. These rivers have afforded the means of bringing large quantities of timber from the interior to places of shipment; and the value in pounds sterling of the imports and exports of the county for the last ten years are given in the following Tables :—

IMPORTS—(*Blue Book*).

Years.	From Great Britain.	British Colonies.			United States of America.	Foreign States.	Total.
		West Indies.	North America.	Elsewhere.			
1836	31,189	10,090	10,570	2,541	9,678	..	64,064
1837	12,044	11,258	10,924	..	10,281	411	44,918
1838	17,324	10,195	26,745	15	15,572	618	72,469
1839	29,420	430	13,940	777	32,797	2,366	79,370
1840	11,541	11,467	3,653	..	43,232	9,124	79,017
1841	13,056	704	8,384	..	38,587	7,549	68,280
1842	2,794	1,788	5,359	..	24,986	581	35,508
1843	7,321	393	5,147	..	19,868	1,842	34,571
1844	7,230	166	5,963	..	17,318	2,680	33,357
1845	18,474	878	12,216	..	23,636	..	55,204

EXPORTS—(*Blue Book*).

Years.	To Great Britain.	British Colonies.			United States of America.	Foreign States.	Total.
		West Indies.	North America.	Elsewhere.			
1836	51,512	36,715	5,167	..	3,361	181	96,936
1837	24,063	32,902	4,240	..	1,017	1,246	63,468
1838	29,002	71,821	14,199	494	4,583	..	120,099
1839	31,251	70,451	9,787	134	4,644	1,185	117,452
1840	20,422	12,011	78,328	..	2,242	684	113,687
1841	14,060	43,477	7,670	..	2,112	1,231	68,550
1842	22,467	66,700	8,673	..	6,012	..	103,852
1843	23,180	40,270	5,249	..	4,083	1,089	73,871
1844	28,580	11,873	4,286	..	2,058	270	47,067
1845	48,704	7,958	3,388	..	4,478	..	64,530

The extent of ship-building in this county during the last twelve years, will be found in the annexed return on that branch of business, under the head of St. Andrews.

At some pains, a comparative statement has been procured, showing the quantities of the principal articles exported from Charlotte county in the years 1825, 1830, 1835, 1838, 1841, 1842, 1843, 1844, and 1845, which statement is as follows:—

Articles.	1825	1830	1835	1838	1841	1842	1843	1844	1845
Timber . . . Tons	27,820	25,774	15,568	4,062	2,362	4,895	185	468	3,100
Boards and Plank M. feet	4,311	12,600	13,005	26,446	17,077	23,368	19,614	20,185	27,819
Deals . . . M. feet	3,118	2,994	9,699	8,821	6,718	8,283	8,746		
Masts and Spars . No.	1,779	1,334	2,353	2,204	2,041	1,160	1,698	4,846	2,034
Lathwood . . . Cords	857	581	491	193	53	108	32	114	272
Laths . . . M.	..	..	1,220	1,570	814	1,732	15,330	3,940	4,264
Shingles . . . M.	3,231	11,023	8,265	20,439	20,247	29,736	13,886	11,884	10,819
Staves . . . M.	77	142	367	56	59	57	19	..	2
Oars . . . Feet	3,476	9,600	19,726	19,891	19,220	30,664	8,972	5,144	1,064
Cedar Posts . . No.	..	..	..	1,100	660	680	740	..	..
House Frames . No.	..	..	..	232	367	390	33	40	33
Clapboards	..	..	1,500	95,625	95,750	163,925	28,725	175,212	195,430
Pickets	..	..	..	..	64,110	67,100	56,750		
Dried Fish . . Quintals	6,233	9,280	3,536	4,977	2,108	1,493	883	200	30
Pickled Fish . . Barrels	897	5,355	2,675	1,462	677	1,702	210	87	459
Smoked Fish . . Boxes	1,207	1,066	1,342	5,904	8,160	7,017	3,279	555	3,522
Lime . . . . Casks	..	..	..	743	9,782	13,739	..	6,520	7,626

The fisheries in this county, in the vicinity of West Isles, Campo Bello, and Grand Manan, are excellent, and have been prosecuted to some extent. That the exports of fish should be so small as above stated, is somewhat singular, and requires explanation. These fisheries might be prosecuted with advantage on a much larger scale, but they need protection against foreign aggression, and judicious encouragement. A plan for encouraging the coast fisheries of Ireland, has been adopted by the Irish Fishery Board, which is deserving notice. It was stated to a Committee of the House of Commons by J. Redmond Barry, Esq., the Director-General of the Coast Fisheries in Ireland, that the Board had, within a few years, adopted the plan of small loans to enable the peasantry upon the coast to avail themselves of the advantage of their contiguity to the fisheries. Mr. Barry stated that the plan had worked admirably well. Many persons who were an encumbrance and burthen to society, no better than

paupers, had become productive, useful, and industrious, and had repaid, with the most extraordinary degree of punctuality, these small loans. Mr. Barry, being asked by the Committee, if there had been any other operations of the Fishery Board which had a tendency to develope and stimulate productive industry, replied that the Board had been engaged in the building of small piers upon different parts of the coast, for the purpose of encouraging the fisheries. These piers had proved extremely useful for agricultural purposes, for landing sea-manure, and for the general purposes of trade; it was added, that the piers had been built by grants in aid of local contribution.

The encouragement of the fisheries of the province generally is a subject of very great importance; and the establishment of Fishing Loan Funds, for aiding and assisting the poor but hardy and industrious fisherman, is a matter well worthy immediate attention.

An Agricultural Society has been established in Charlotte county nearly thirty years, and their annual reports show that activity and enterprise have always prevailed among its members. In the twenty-third annual report of the Society, presented in 1843, it is stated, that the bounty granted by the Society on lime, had induced members to try it as a manure, and wherever it had been applied on land sufficiently drained, the benefit had been obvious, and in several instances the yield of crop, especially of wheat, had been extraordinary. One acre in the vicinity of Saint Andrews, thus treated, had yielded fifty bushels of good wheat, weighing 59 lbs. per bushel.

The twenty-seventh annual report of the Society was presented on the 12th January instant, and it states that the past season having been one of the most favourable for agricultural pursuits with which the county had been blessed for many years, the different kinds of produce had amounted to a full average crop. The various kinds of grain had been very productive, and had been harvested in good condition. The potato crop in Charlotte was a total loss in the year 1845; this report states the gratifying fact, that seed having been imported into the county, the potato crop of 1846 has been of good quality, and generally free from disease; and that, with reference to the quantity planted, the crop had been a fair one.

There is abundance of both lime and marl in this county, as well as sea-manure, and in those respects Charlotte possesses advantages over most other counties in the province.

In 1836 an Act was passed to incorporate the "Saint Andrews and Quebec Railroad Company," which still remains in force, and under which a Company has very recently been organised in terms of the charter. A deputation from the promoters of this railway proceeded to London in 1836, and submitted the project to Government, with a petition to His Majesty for aid. A sum of 10,000*l.* was thereupon granted for an exploration and survey of the line, about 9,000*l.* of which was expended in prosecuting the objects for which it was made, principally under the superintendence of Major Yule of the Royal Engineers, whose report is extremely favourable to the undertaking.

In consequence of a remonstrance from the United States Government in 1837, further proceedings were suspended, and that suspension has continued until the past season, when measures were adopted for opening the line as far as Woodstock, and the Company was organized.

On inspecting the plans of survey and sections of the line, prepared by the several surveyors under Major Yule's direction, it appears, that the survey commenced at Katy's Cove, (on the east side of the town of St. Andrews,) and thence proceeded on a course nearly north, to the foot of the Chamcook Lake; thence around the eastern shore of that lake, and after crossing its inlet, thence northerly on the western shores of the second and third Chamcook Lakes, to the valley of the Waweig, which river it reaches at ten miles from the starting point; thence north-eastwardly to the valley of the Digdeguash, the western bank of which river is struck at 20 miles on the line; thence northwardly and westwardly, up the valley of the Digdeguash, on its western side, to the sources of that river, at 40 miles on the line; thence north-eastwardly, through the basin of the Little Digdeguash river, to the valley of Cranberry Brook, which brook is crossed precisely at the 50th mile; thence nearly due north, and almost on a dead level for 10 miles, through the valley of the Shugomock river, a branch of which is crossed at the 60th mile; thence north-westerly, through the Howard Settlement, to the north-western bank of Eel river, which it touches at the 70th mile. From this point the surveyed line followed a north-west course, until near the boundary, and thence proceeded northerly, along the boundary between Maine and New Brunswick. In order to connect the line with the populous and thriving village of Woodstock, it is now proposed to cross Eel river at the 70th mile, and thence proceed on a course nearly north, until the west bank of the river St. John is reached at or near Meductic Point; and thence to follow the level alluvial bank of the St. John to Woodstock; the whole distance from St. Andrews being about 82 miles. None of the levels from St. Andrews to Eel river exceed 30 feet per mile, being a gradient of 1 in 175.

It is proposed, at present, to commence the construction of this railway, not at St. Andrews, but at Waweig, 10 miles from St. Andrews, and thence proceed northwardly. There is a good harbour for shipping of the largest class at Waweig, and it is stated, that each mile the railway advances from that point, will develope abundant resources, the transportation of which to the place of shipment will render the line profitable from the commencement.

It is also proposed by the St. Andrews Company to adopt wooden rails; in fact, to construct the whole railway upon wood; and to use upon their carriages Prosser's patent railway guide-wheels, which are peculiarly adapted to wooden rails. The following brief description of these guide-wheels, and of the manner of constructing the intended railway, is condensed from information furnished by the president of the Company, and is offered as possessing peculiar interest at the present moment.

The guide-wheels are the invention of Mr. Prosser, the patentee, who projected them in order to improve the mode of guiding carriages along the rails, and to diminish the friction and wear and tear of machinery, thus enabling him to construct cheap lines, by the substitution of a less expensive material for rails than iron.

The four principal wheels which support the carriage are without flanges, and present a perfectly flat surface to the rail. It is evident, that upon encountering the slightest curve in the rails, these wheels would be quite inadequate to keep the carriage upon its destined route. The remedy provided is in four extra, or anti-friction-wheels; these are placed, two in front

and two behind the carriage, upon axles, at an angle of 45 degrees with the main axles. A deep groove formed by two flanges is made in their circumference, exactly corresponding to the inner and upper angle of the rail, and thus they serve as the guiding-wheels to the whole machine. When the railway is in the direction of a right line, only one of each pair of bevel wheels can be in action at the same time, according to the tendency which the carriage may have to move on either side from the centre of the rail. On a curve, the difference is simply, that the outside bevel wheel of the front pair, and the inside one of the back pair, come into play, and counteract the disposition there is in the carriage to fly off at a tangent with the curve. Another very important function performed by the bevel wheels is, that in case of an accident occurring to the running wheels, they would act as supporters to the carriage, and carry it on in safety. In traversing curves, the advantage of the bevel wheels is stated to be very great, as with these wheels a curve of 600 feet radius may be traversed with safety at a speed of 25 to 30 miles per hour. The rails may be made of beech, or other hard timber, six to eight inches square, let into wooden sleepers, and secured by wooden wedges, forming one great frame or wooden grating of longitudinal and cross sleepers.

The bite of the wheel upon an iron rail is stated to depend much on the weight of the engine, which is generally made to weigh from 16 to 18 tons. This weight on moderate gradients, and at a speed of 20 or 30 miles per hour, enables it to draw from 80 to 100 tons. The carriages are built to weigh about three tons; this strength being found necessary to withstand the concussion, abrasion, and oscillation. An engine weighing 10 tons, running on wood, is alleged to have more tractive power than one weighing 18 tons running on iron; and as the concussion and abrasion is comparatively but trifling, carriages built to weigh one and a half tons will be as strong as those having to run on iron weighing three tons.

An important question connected with this subject is the durability of the materials of which the rails are composed. A short experimental line of wooden railway was laid down near Vauxhall Bridge, and a second experimental line nearly two miles long was afterwards laid down on Wimbledon Common. The engine employed for the experiment weighed about six tons; it passed over the rails during the two months it ran, 8000 times, in every variety of weather, which is stated to be nearly equal to seven years' traffic of twelve engines per day. The rails were made of larch, (prepared by Payne's Patent Process for preventing dry rot,) about nine feet long and six inches square; yet upon examining them after the severe test to which they had been subjected, they exhibited no appearance of wear from the friction of the wheels on the upper surface, as the saw-marks were not even effaced, nor had the bevel wheels exercised any abrasing effect on the edges, which remained as sharp and well defined as they were when first laid down.

It is stated, that the result of a series of experiments, made to ascertain the proportionate power of the bite of wood over iron, has fully borne out the assertion of the patentee, that the bite of the driving wheel on wood, is nearly double that on iron. A consequence of this difference is, that railway trains may be propelled up much steeper inclines on a wooden railway than could be overcome on iron rails; and as the cost of making railroads depends greatly on the quantity of earth to be removed, the vast expenses

of deep cuttings and lofty embankments, and above all, the necessity of costly tunnels, may be avoided by the adoption of the wooden rail.

From the very level character of the country already surveyed for the St. Andrews railway, and the abundance of excellent timber along the line, the Directors are impressed with the belief that they can construct a wooden railway to Woodstock at an average cost of 1000*l.* per mile. If a good working railway can be constructed on this line, at even double that amount per mile, there can be very little doubt that the investment would prove an extremely profitable one. The anchorage at Waweig is the point nearest to Woodstock, which can be reached by ship navigation; and the great difference in distance alone must give this line several very decided advantages.

From St. John to Fredericton, by the present post route, the distance is	65	miles.
From Fredericton to Woodstock . .	61	„
Total . .	126	„
From Waweig to Woodstock, the distance is .	72	„
Difference in favour of the Waweig line	54	„
From the anchorage at Newcastle, on the Miramichi, to Boies Town, is	65	„
From Boies Town to Woodstock (direct), is .	60	„
Total . .	125	„
The distance from Waweig to Woodstock being .	72	„
The difference in favour of the Waweig line is	53	„

The Reports state, that there is much good vacant land on the surveyed line of this railway, which also passes through and near some very thriving settlements. It is also stated, that extensive groves of valuable timber of large size exist in the vicinity of the line, which, from their situation, will probably never be brought to market, unless by means of a railway.

A railroad to Woodstock, from any accessible point on the sea-board, is a matter of very great moment, as connected with the supply of the upper part of the St. John with a large amount of merchandise, yearly on the increase, and the ready transport to a port of shipment of the products of the forests, of the soil, and of the mines and quarries, which may be worked extensively in the county of Carleton.

KING'S COUNTY.

This county contains 849,920 acres, of which 662,752 acres are granted and located, leaving 187,168 acres ungranted and vacant. The quantity of vacant land sold in 1845 was 12,896 acres. The population in 1840 was 14,464 souls; the estimated quantity of cleared land, 69,452 acres. There has been a considerable addition to this amount of cleared land since 1840, settlement and cultivation having made great advances subsequently to that period.

King's is an agricultural county, and the land in the eastern division is of superior quality, and settling rapidly. The western division of the county, with the exception of the flourishing parish of Greenwich, is almost in a wilderness state. The parish of Westfield is very broken and hilly, with numerous lakes and streams, abounding, however, with valuable timber.

There are no statements existing from which any account can be given of the quantity of agricultural produce raised annually in this county. The amount, however, must be very large, and the surplus finds a market at the city of St. John. It has been previously stated that salt and gypsum are abundant in Sussex Vale; the deposit of iron ore near Bull Moose Hill, in Springfield, is very large, and it is said that the ore is of good quality. A railway through the vale of Sussex, even if constructed on Prosser's principle, with wooden rails, with branches or feeders from the valleys of the Mill Stream, Smith's Creek, Ward's Creek, and Trout Creek, would open up a most valuable country, abounding in resources of every description. Among the advantages of wooden railways, not the least is the cheapness and facility of their construction, especially in a country abounding in timber well adapted for the purpose. If it be deemed more advantageous to construct long lines of railway with iron rails, still the feeders from towns or settlements within their reach, may be accommodated with railway communication, at an expense which their more limited traffic will enable them to bear. These branch railways would pour into the main line a great accession of traffic, and all parties would thus be benefited.

A great eastern line of railway from the city of St. John, through King's County to Westmorland, and the northern counties on the Gulf Shore, would, in a few years, be maintained profitably by such feeders, which would be constantly adding to their number; and, by promoting the settlement of the country on a large scale, would increase its productions, and cause the development of its valuable resources. The county of Albert would be immensely benefited by such a line of railway, and, in return, would most certainly prove a valuable supporter, from the large quota of traffic which it alone might furnish.

The line of the proposed railway from St. John to Fredericton, on the western side of the river St. John, will pass through the western division of King's County, and will, when constructed, lead to the immediate settlement of the great woodland district in that part of the county.

The valuable quarries of excellent granite, now largely worked at the head of the Long Reach, must not be omitted in estimating the resources of King's County.

QUEEN'S COUNTY.

The great extent of rich alluvial land in Queen's County renders it exceedingly valuable for all the pursuits of agriculture. The quantity of land in this county is 961,280 acres, of which 514,204 acres are granted and located, and 477,076 acres remain ungranted and vacant. The quantity of vacant land sold in 1845 was 5793 acres, all in small lots, chiefly for immediate settlement. The greatest quantity sold to one individual in that year, was 265 acres; two lots of 200 acres each were

sold to settlers, and all the remaining quantity was disposed of in lots of 25 acres and upwards.

The population of Queen's County in 1840 was 8232 souls, and the estimated quantity of cleared land 43,089 acres. The population and quantity of cleared land have been steadily on the increase since the census of 1840, and the population of the county is now estimated at nearly 12,000 souls.

This county has furnished the port of St. John with large supplies of timber for a great number of years, and appears likely to do so for some time to come.

There is stated to be an extensive bed of iron ore at Coote Hill, to the westward of the river St. John in this county, which requires further examination, no researches having yet been made to ascertain the extent of the deposit, or the value of the ore. As connected with railways, every deposit of iron ore in New Brunswick now requires to be carefully examined.

In almost every part of Queen's County, east of the river St. John, a seam of coal has been found at 20 or 30 feet from the surface, varying from 18 to 21 inches in thickness. This coal is highly bituminous, possessing the rich caking qualities of the Newcastle coal of England, and has, at different places and periods, been worked to some extent. Researches have also been made to ascertain if thicker beds of coal existed at a greater depth from the surface, and, on one occasion, the borings were continued to the depth of 410 feet, passing through several thin seams of coal, but without indicating a thick bed. There is some reason to believe, however, that the borings were not made in the best situations, or that the parties conducting the borings had neither sufficient skill nor science for so important an undertaking. The existence of deep beds of coal in this county remains to be determined; but, in the mean time, the actual presence of a seam of good quality, easily worked, and extending over a wide extent of country, is a most important fact in connection with the proposed establishment of railways, and is a matter of the greatest consequence to Queen's County, and to the province.

An Agricultural Society has been but recently established in Queen's County; but no statements exist from which the amount of the annual agricultural products of the county can be ascertained.

A striking instance, well authenticated, of the progress made by an emigrant who settled in this county some years since, having lately come to the writer's knowledge, it is here mentioned, not as a solitary case, but as one among many others of similar character, and as exemplifying what may be effected by prudence and industry in New Brunswick.

The emigrant landed at St. John from Scotland, in the year 1820, with a wife and five children, (the oldest thirteen years of age,) but without any means. He obtained employment during the summer as a stone-mason's labourer, and by the most severe economy and frugality, saved the sum of 18*l.* in that season. With this sum he procured a grant of land in the New Jerusalem settlement, then first forming in Queen's County, and went to his lot in the wilderness, three miles distant from any settler. He had no neighbour for three years, nor during that time any road to his clearing; and it was some time after that before anything approaching to good roads were opened or made. Yet here he pursued a steady course

of industry, his family increasing to eleven in number, five boys and six girls, some of whom have married, and he has been able to settle them comfortably by giving them farms and an outfit. This settler now owns 500 acres of land, part of which is in a good state of cultivation, with three farm-houses, five barns, an oat mill and kiln, and a large amount of stock upon it. A valuation of this emigrant's property was made in this month of January, 1847, for the purpose of a division among the children, and, at a moderate estimate, was found to amount to 3000*l.* A large family has been brought up decently and comfortably, and are now in a position to become independent and wealthy.

The extreme western portion of Queen's County, like that of King's, is nearly all in wilderness state. The proposed railway from St. John to Fredericton will probably traverse this portion, and in such case will add materially to its value and importance.

COUNTY OF SUNBURY.

When the whole province of New Brunswick formed a part of Nova Scotia, it was designated the County of Sunbury. At present, the county bearing that name is the smallest in New Brunswick, with the exception of St. John. It contains 782,080 acres, of which 377,078 acres are granted and located, and 405,002 acres remain ungranted and vacant. The population in 1840 was 4260 souls, and the quantity of cleared land 12,262 acres. The quantity of vacant land sold in 1845 was 2114 acres, in lots from 50 to 130 acres, except one lot of 240 acres.

Lumbering has always been followed by the inhabitants of this county to a greater or less extent, and greatly to the neglect of agriculture. The first British settlement in New Brunswick was made in 1762 on the alluvial banks of the river St. John, in what are now styled the parishes of Maugerville and Sheffield. The report of the Sunbury Agricultural Society for 1842, says—"Much remains to be effected in removing prejudice, and producing reform. There are still allotments of land, containing 500 acres each, which have been settled or occupied from 50 to 70 years, which have not yet 30 acres cultivated, although in the centre of the province, and bounded on the beautiful river St. John, within ten miles of Fredericton. Thousands of acres of valuable alluvial land in this county are still unreclaimed, and there are many acres of old worn-out meadow-land which has been annually mown in the summer and pastured in the fall, for more than 50 years, without ever having been ploughed in that time, and which, although naturally a superior soil, now produces but a light crop; and we still see the barn-yard drained across the highway into the river, to the great annoyance of the traveller, and loss of the owner."

Some of the finest land in this county is on the north and south branches of the Oromocto, and many farms there, for picturesque beauty and fertility, may compare with any in the province. The new settlements, too, in that quarter, are in a thriving condition; and farming, generally, appears to be there conducted in a more thorough and energetic manner than in that part of the county which has been long settled.

The writer had occasion to examine this part of Sunbury last season, and can state that the rivers generally flow through wide valleys, with very

level alluvial land in the bottom, and gently sloping hills bounding them on either side. Through these valleys a more direct and much more level route between Fredericton and St. John can be found than by the Nerepis road. A series of bye roads now pass through the Maryland settlement, the Rushagonis settlement, and thence, by Hartt's Mills, to the valley of the south branch, whence the valley of Back Creek is followed through the Patterson settlement, and down the valley of the Douglas to the Nerepis road, a short distance above the Eagle Cliffs, at the bridge over the Douglas river. The distance between the seat of government and the city of St. John, by this route, is only 60 miles, instead of 65 by the Nerepis road; and it has the advantage of being a much more level country, where a good road can be readily and cheaply made, with no large rivers to cross, and no danger of the road being rendered impassable by back-water in the spring. This line of country offers great facilities for the establishment of an excellent line of great road between St. John and Fredericton; and the promoters of the New Brunswick railway will doubtless avail themselves of the advantages it offers for their line of railway.

YORK COUNTY.

This is one of the largest counties in the province, containing 2,201,600 acres, of which 940,914 acres are granted and located, and 1,230,686 acres remain vacant and at the disposal of Government. The population in 1840, was 13,995 souls, and the estimated quantity of cleared land, 44,818 acres. The population of the parish of Fredericton in 1840, was 4002 souls; but the town of Fredericton alone is now supposed to contain 6000 souls.

Although lumbering has been prosecuted to some extent by the people of York, yet agriculture has not been altogether neglected. As the capabilities of the county are great, and it possesses some advantages in being placed almost in the centre of the province, in a favourable position on the river St. John, and with the seat of government within its limits, farming has been prosecuted to some extent, and with marked success.

An average crop of oats in this county, of the best quality, is stated to be thirty bushels to the acre; but in the season of 1846, there were fields in and near Fredericton which yielded sixty bushels to the acre. In 1842, before the potato disease was known, land of good quality, in proper condition, yielded an average of 600 bushels of potatoes per acre. The wheat crop in this county has suffered greatly from the ravages of the weevil of late years. The weight of a bushel of wheat grown in York averages about 60 lbs. The potato crop, which was almost an entire failure in 1845, suffered but partially in 1846; it is hoped that if the season of 1847 prove favourable, the disease will disappear altogether.

Two very striking instances of the success attending the formation of new settlements in the wilderness, by associations of settlers, having the privilege of making their own roads at a reasonable rate, can be adduced in this county. The Harvey settlement was formed in 1837, by a party of emigrants from the north of England, who landed in New Brunswick in a very destitute condition. A report upon this settlement was presented to his Excellency the Lieutenant-Governor, by the Hon. L. A. Wilmot,

the Commissioner who formed it, on the 9th February, 1844, accompanied by a statistical return. This report states, that it is shown by the return, that from land where not a tree was felled in July, 1837, there had been taken, during the preceding autumn, 260 tons of hay and straw, and 15,000 bushels of grain, potatoes and turnips; and that the great success which had attended the labours of these industrious and valuable settlers, afforded an unquestionable proof of what might be done on the millions of wilderness land in New Brunswick. The return shows the number of settlers to be forty-five, and the value of their improvements to be 4289*l.* 10*s.* The settlers accompanied the original return with the following observations:—"The climate of New Brunswick agrees well with the constitution of Englishmen; the air is salubrious, and the water as pure and wholesome as any in the world. During the six years of our location but two deaths have occurred, while there have been thirty-nine births without the presence of medical aid. Six years' experience has convinced us, that notwithstanding the privations to which new settlers are exposed, diligence and perseverance must ensure success."

The "teetotal settlement" was formed in 1842, under the same Commissioner, by a party of destitute emigrants from the south of Ireland. In a report from the Commissioner, dated 25th January, 1844, it is thus stated:—"The results of this the second effort in which I have been engaged in forming settlements in the wilderness, have afforded me the most unmingled satisfaction. Where but two years ago stood a dense forest, there have been gathered by thirty-five settlers, during the past autumn, 7236 bushels of grain, potatoes and turnips. The accompanying return shows an estimated value of 1137*l.* in buildings and clearings, and when there is added to this the market value of the crop, exceeding 800*l.*, we have about 2000*l.* return (exclusive of the making four and a quarter miles of road) from a tract of land, which in its wilderness state, would not in the same time have produced one shilling. I cannot now consider the successful occupation of our wild lands by associated bodies of settlers, having the privilege of making their own roads at a reasonable rate, as a doubtful experiment. No antagonist theory can prevail against the practical experience which can now be referred to. Similar management must produce similar results, and I am well persuaded, that no other system is so well calculated to promote the improvement of our millions of wilderness acres, and thus to advance the population and commerce of the province."

The central position of the town of Fredericton, its importance as the seat of government, its recent establishment as a free port for the admission of British vessels, and the advantages of its situation with reference to the great highway of the river St. John, point it out as an eligible focus for railways extending to various parts of the province. The New Brunswick railway, already mentioned, is one of these. Another eligible line might be formed by passing up the valley of the Nashwaak, thence across the Portage to Boies Town, there to connect with a railway from the towns on the lower part of the Miramichi. The determination of a line for the trunk railway from the Atlantic to Quebec would also determine the various branch lines which might be profitably formed to intersect that line, and act as feeders for its support.

COUNTY OF CARLETON.

This is by far the largest county in the province, containing no less than 5,292,000 acres, of which 811,402 acres are granted and located, and the remaining 4,480,598 acres are vacant, and at the disposal of Government. A portion of this county, containing by estimate 2,700,000 acres (of which 280,600 acres have been at various times granted and located by the province of New Brunswick) has been claimed by the province of Canada since the settlement of the disputed boundary with the United States by the Treaty of Washington. The Government of New Brunswick has ever exercised jurisdiction over this portion now claimed by Canada, and has borne all expenses occasioned by its management and protection. A portion of New Brunswick which lies north of the Restigouche, and eastward of the due north line from the monument, is not included in the estimate of the number of acres in Carleton.

An Act of Assembly was passed in 1844, with a suspending clause, for erecting the upper part of this county into a separate county, by the name of Victoria; but owing to the unsettled state of boundary with Canada, the Act has not yet come into operation.

The population of the county of Carleton in 1840 was 13,381 souls, and the estimated quantity of cleared land 49,553 acres. The quantity of vacant land sold in 1845 was 5871 acres, all, with one exception, in lots less than 200 acres.

An Agricultural Society was established in this county six years since, and the annual reports show that the members have been both active and diligent. The soil of Carleton, generally, is of very superior quality, and the portion already cleared and cultivated produces crops of grain and potatoes quite equal to any in the province both in quantity and quality. Some very superior stock has also been introduced by Charles Perley, Esq., who, at very considerable expense, has imported animals of the best breed in the United Kingdom, and thereby greatly improved not only the stock of this county, but the stock of several other counties. The county of Carleton, from this gentleman's spirited exertions, may boast the best breeding stock in New Brunswick.

There is some land of very superior quality in the valley of the Tobique, which, as yet, is almost wholly in a wilderness state. Whenever this valley is rendered accessible to settlers by highways or railways, it will be one of the districts to which there will be a rush of settlers.

There are extensive deposits of gypsum on the Tobique river, and very fine slate for roofing purposes near its confluence with the river St. John. Near Woodstock there is a deposit of iron ore, which the geologists of Maine have ascertained to be of very great extent and of excellent quality. The county of Carleton furnishes a large proportion of the squared pine timber sent down the river St. John, and it possesses an almost inexhaustible supply of the best timber of all descriptions. The establishment of railways from St. Andrew's and St. John, or from either, to Woodstock, will throw open the vast resources of this county in timber and iron, and rapidly develope its agricultural capabilities. As a station for supplying the upper country on the St. John river, Woodstock is of some importance. The formation of railways from St. John or St. Andrews would almost certainly lead to the establishment of other railways from Woodstock

to the Grand Falls (another most important station), to Boies Town and to Campbelton, and Dalhousie, on the Restigouche, with which it is highly desirable a communication across the country should be opened.

So great an extent of this county remains in a wilderness state, that it is difficult to state its resources or capabilities; but from what is already known, it may be safely stated that they are not inferior to those of any other county in New Brunswick.

***Tables showing the principal Articles exported from the Port of St. John and its Out-bays, from* 1819 *to* 1845, *both years inclusive; the estimated Value in Pounds Sterling of the Imports and Exports of New Brunswick, from* 1828 *to* 1845, *both years inclusive; and the Numbers and Tonnage of the Ships built in the Province, from* 1825 *to* 1845, *both years inclusive; compiled by M. H. Perley, Government Emigration Agent.—January,* 1847.**

Return of the Principal Articles exported from the Port of St. John and Out-Bays (including Miramichi, Bathurst, Dalhousie, Richibucto, Shediac, and Dorchester), from the year 1819 to the year 1845, both inclusive.

Articles.	1819	1820	1821	1822	1823	1824
Timber . . . Tons	247,894	207,899	408,560	237,821	225,021	298,236
Boards & Plank. M. ft.	26,545	20,970	26,415	10,188	12,177	12,997
Masts and Spars. No.	6,232	8,001	7,713	6,183	4,392	4,433
Lathwood . . Cords	6,099	5,039	10,872	14,385	5,021	5,718
Shingles . . . M.	6,616	11,682	18,409	3,014	1,173	499
Staves . . . ,,	5,850	6,837	6,055	2,531	2,087	2,271
Oars . . . . No.	10,910	14,114	9,861	Ft. 69,995	No. 2,747	3,341
Handspikes . . ,,	15,871	9,405	5,849	9,258	5,433	3,524
Hhd. Shooks. . ,,	19,890	12,958	5,614	268	284	4,461
Dried Fish . . Quint.	40,073	49,063	45,895	22,067	14,260	18,165
Pickled Fish. . Bbls.	..	..	..	7,385	8,712	11,006
Herrings . . . ,,	11,436	6,243	12,508	..	..	..
Smoked Fish . Boxes	..	..	..	548	6,861	5,436
Salmon . . . Bbls.	362	372	836	..	..	..
,, . . . Kitts	..	..	..	2,271	..	..
,, Smoked . .	..	..	..	..	..	3,662
Fish Oils . . Bbls.	523	564	453	186	186	168

Articles.	1825	1826	1827	1828	1829	1830	1831
Timber . . . Tons	388,395	279,644	187,332	238,666	190,162	232,515	186,913
Boards & Plank. M. ft.	14,623	10,793	18,385	18,321	17,018	19,205	21,782
Masts and Spars. No.	7,131	4,903	6,488	4,930	5,579	4,222	2,920
Lathwood . . Cords	5,840	4,700	3,189	4,278	3,436	4,717	3,750
Shingles . . . M.	619	1,216	3,692	4,675	3,182	3,036	3,414
Staves . . . ,,	1,486	2,316	3,076	792	452	505	302
Oars . . . . No.	4,550	7,355	Ft.83,302	No.6,833	8,385	7,568	5,524
Handspikes . . ,,	4,818	7,837	3,102	4,315	1,783	2,333	1,159
Hhd. Shooks. . ,,	..	..	..	..	..	..	..
Dried Fish . . Quint.	29,490	21,422	4,680	16,651	16,907	18,442	17,865
Pickled Fish. . Bbls.	9,514	12,844	10,948	2,710	2,209	2,109	2,215
Herrings . . . ,,	..	..	..	9,282	12,409	3,286	22,917
Smoked Fish . Boxes	7,030	8,271	8,204	4,946	5,180	660	9,138
Salmon . . . Bbls.	..	..	504	295	1,189	1,776	1,199
,, . . . Kitts	..	..	2,692	1,725	2,721	2,635	2,597
,, Smoked . .	..	..	2,655	2,531	5,795	5,350	4,812
Fish Oils. . . Bbls.	406	91	546	334	244	306	220

Return of the Principal Articles exported from the Port of St. John and its Out-Bays, &c.— *continued.*

Articles.	1832	1833	1834	1835	1836	1837	1838
Timber . . . Tons	208,227	185,135	195,421	278,195	219,099	222,095	269,218
Boards & Plank. M. ft.	30,962	6,855	5,625	49,104	46,588	56,818	4,923
Deals . . . ,,	..	30,171	35,842	..	..	..	56,825
Masts and Spars. No.	4,178	4,292	5,430	4,378	3,537	4,230	3,461
Lathwood . . Cords	3,852	3,660	3,352	5,090	3,795	3,939	4,945
Shingles . . . M.	5,090	6,345	4,450	2,499	2,983	5,181	4,011
Staves . . . ,,	289	1,517	2,530	862	784	732	336
Oars . . . . No.	5,465	8,604	6,209	7,387	5,247	5,739	8,383
Handspikes . . ,,	1,564	1,140	3,046	1,575	1,602	1,324	1,009
Dried Fish . . Quint	18,502	20,224	20,441	21,786	27,543	27,434	14,950
Pickled Fish. . Bbls.	1,874	25,187	30,451	3,199	2,802	3,497	4,651
Herrings. . . ,,	18,335	..	..	25,013	17,790	1,109	3,540
Alewives . . . ,,	..	..	..	..	..	9,198	7,214
Smoked Fish . Boxes	14,167	10,604	3,761	5,483	5,880	11,915	14,135
Salmon . . . Bbls.	692	652	160	88	30	1,843	930
,, . . . Kitts	2,947	2,151	1,965	5,278	4,650	1,120	8,261
,, Smoked . .	4,897	3,708	4,596	9,476	6,964	6,073	..
Fish Oils. . . Galls.	6,695	40,976	48,292	141,183	77,935	210,807	223,950

Articles.	1839	1840	1841	1842	1843	1844	1845
Timber . . . Tons	251,379	261,118	220,690	125,217	191,235	190,320	244,788
Boards & Plank. M. ft.	6,453	4,402	3,511	7,638	8,674	8,144	10,834
Deals . . . ,,	72,365	79,383	78,981	58,295	83,257	108,424	122,740
Masts and Spars No.	3,864	3,254	3,328	2,800	2,312	5,558	2,564
Lathwood . . Cords	4,050	4,544	4,499	2,392	3,393	3,424	4,206
Shingles . . . M.	3,938	4,611	8,173	9,148	6,536	7,042	8,371
Staves . . . ,,	101	96	128	253	51	48	54
Oars . . . . No.	6,715	6,663	11,459	7,761	4,725	3,053	2,158
Handspikes . . ,,	2,014	686	3,401	1,415	1,576	273	664
Dried Fish . . Quint.	23,594	16,832	13,567	15,636	11,320	12,405	8,842
Pickled Fish . Bbls.	1,410	361	459	372	376	246	595
Herrings. . . ,,	6,075	1,435	1,850	1,610	1,058	1,754	5,264
Alewives. . . ,,	7,729	5,755	7,121	9,589	12,169	16,229	9,551
Smoked Fish. . Boxes	13,439	22,325	19,534	7,209	5,389	7,308	10,058
Salmon . . . Bbls.	1,400	1,804	1,825	2,879	2,155	2,479	2,621
,, . . . Kitts	5,600	2,276	2,653	1,232	855	6,419	1,261
,, Smoked . .	10,201	1,059	4,853	1,858	900	406	80
Fish Oils. . . Galls.	106,230	162,317	119,936	4,383	86,623	5,984	78,921

Table of the estimated Value in Pounds Sterling of the Imports of the Province of New Brunswick, from all Parts of the World, from the Year 1828 to the Year 1845, both Years inclusive.

Years.	From Great Britain.	British Colonies.			United States of America.	Foreign States.	Total.
		West Indies.	North America.	Elsewhere.			
1828	295,526	60,237	162,686	..	123,662	1,470	643,581
1829	291,598	72,773	138,527	395	133,976	827	638,096
1830	285,871	92,795	165,796	1,571	146,767	763	693,563
1831	301,729	63,595	159,285	1,785	77,476	..	603,870
1832	314,097	..	261,544	..	123,192	5,216	704,049
1833	295,939	64,311	192,668	4,227	136,432	1,022	694,599
1834	373,297	70,718	213,859	10,029	109,606	3,658	781,167
1835	521,479	59,801	277,879	7,247	102,839	615	969,860
1836	734,394	53,120	340,315	3,614	112,713	5,381	1,249,537

the Province from 1825 *to* 1845 *inclusive.*

ns of the New Vessels registered in the Province of New Brunswick, &c.—*continued.*

Ports.	No.	Registered Tonnage.	Total Tons.	Remarks.
St. John	64	19,493		
Miramichi . . .	21	5,895		
St. Andrews . . .	14	1,900		
			27,288	
Vessels . .	99			
St. John	82	19,893		
Miramichi . . .	19	5,478		
St. Andrews . . .	21	3,796		
			29,167	
Vessels . .	122			
St. John	108	30,454		
Miramichi . . .	27	9,837		
St. Andrews . . .	29	5,573		
			45,864	
Vessels . .	164			
St. John	108	42,922		
Miramichi . . .	31	12,231		
St. Andrews . . .	29	8,943		
			64,104	
Vessels . .	168			
St. John	78	30,449		
Miramichi . . .	31	13,632		
St. Andrews . . .	10	3,058		
			47,140	
Vessels . .	119			
St. John	54	12,558		
Miramichi . . .	20	7,129		
St. Andrews . . .	13	3,153		
			22,840	
Vessels . .	87			
St. John	40	8,745		
Miramichi . . .	14	3,967		
St. Andrews . . .	10	1,838		
			14,550	
Vessels . .	64			
St. John	54	13,292		
Miramichi . . .	25	9,266		
St. Andrews . . .	8	1,985		
			24,543	
Vessels . .	87			
St. John	56	21,883		
Miramichi . . .	21	5,563		
St. Andrews . . .	15	1,526		
			28,972	
Vessels . .	92			

Return of the New Vessels registered in the Province of New Brunswick, &c.—*continued.*

Years.	Ports.	No.	Registered Tonnage.	Total Tons.	Remarks.
1827	St. John and Miramichi	94	20,097		
	St. Andrews . . .	5	1,709	21,806	
	Vessels . .	99			
1828	St. John and Miramichi	63	14,379		
	St. Andrews . . .	8	1,277	15,656	
	Vessels . .	71			
1829	St. John and Miramichi	55	6,678		
	St. Andrews . . .	9	1,772	8,450	
	Vessels . .	64			
1830	St. John and Miramichi	40	8,178		
	St. Andrews . . .	12	1,064	9,242	
	Vessels . .	52			
1831	St. John	40	6,476		
	Miramichi . . .	8	1,173		
	St. Andrews . . .	13	922	8,571	
	Vessels . .	61			
1832	St. John and Miramichi	55	11,465		
	St. Andrews . . .	15	2,616	14,081	
	Vessels . .	70			
1833	St. John	63	12,835		
	Miramichi . . .	7	1,804		
	St. Andrews . . .	27	3,198	17,837	
	Vessels . .	97			
1834	St. John	..	29,916		
	Miramichi . . .	..	2,172		
	St. Andrews . . .	..	1,052	24,140	
	Vessels . .	92			
1835	St. John	72	19,920		For owners in the United Kingdom—5 vessels 916 tons.
	Miramichi . . .	13	3,690		
	St. Andrews . . .	12	2,186	25,796	
	Vessels . .	97			
1836	St. John	81	24,679		
	Miramichi . . .	8	3,147		
	St. Andrews . . .	11	1,817	29,643	
	Vessels . .	100			

Report and Estimate concerning an Electro-Magnetic Telegraph between Fredericton and St. John, addressed to Sir William M. G. Colebrooke, K.H, &c. &c., Lieutenant-Governor of the Province of New Brunswick, 25th January, 1847.

Fredericton, 25th January, 1847.

SIR,—At the desire of your Excellency we have prepared a short Report upon a line of telegraphic communication between Fredericton and St. John.

It has been drawn up with as much care as the novelty of the subject, and the means of judging at our command have allowed; and, in submitting it, we desire to say that it will always be our anxious wish to assist your Excellency in forwarding this most important and laudable undertaking.

A revolution in the telegraphic system has been recently effected by the aid of a force called Electro-Magnetism; and this application of the force in question, seems to be fraught with consequences not less important to mankind than those which have resulted from the application of steam to the purposes of locomotion.

The Electro-Magnetic Telegraph can be made to convey intelligence in few or in many words, on matters of trivial or of vital importance, openly or with secrecy, for one or for one thousand miles, by night or by day, in winter or summer, at a cost not greater than is incurred by the present Post Office system, and with a velocity which is only comparable to that of a thought or a sensation, or to a ray of light, or a flash of lightning.

Not only are all these marvellous effects asserted to be possible, but they have been demonstrated, and are capable of being realized wherever it is thought worth while to try.

The value of such a mode of transmitting intelligence cannot be over estimated, and we feel confident that, within a very few years, the adoption of this system will become general in all civilized countries. The thoughts, the feelings, and the wishes of one man will be conveyed to another, 100 miles off, as fast as they can be uttered or intelligibly expressed to himself, or to his nearest neighbour, and we will at length have acquired a power over time and space as great as that which we have already acquired over matter.

As these remarks are based upon a consideration of what has been already achieved and done by means of the Electro-Magnetic Telegraph, it remains still to determine whether the importance of the communications between any two given places is sufficient to justify the outlay required to secure the advantages of such rapid transmission.

Although we do not feel that it is our province to decide upon the importance of the communications now going on between the seat of Government and the chief seat of commerce in New Brunswick, yet we cannot refrain from stating our decided conviction that, if the present communications are not of sufficient importance, the mere fact of the establishment of an electro-magnetic telegraph would soon make them so.

These considerations are entirely apart from any that might attach to a line of railway from St. John to Fredericton, or to the connection of our telegraphic circuit with others from Quebec to Fredericton, or from St. John to Halifax; we speak at present in favour of a line between this place and St. John, and of that line as being worthy of immediate adoption.

By the estimate which we have attempted to make, the cost of construction and maintenance for the first year would not much exceed five thousand pounds currency, and the permanent charges would not exceed one thousand pounds a-year, so that we may be justified in saying that the outlay is not great in comparison of the public advantages which would result from its establishment.

But it is not all expenditure: there is a certainty of considerable returns, at both termini, in the course of every year. If these exceeded the interest on the money expended, it might fairly be asked whether, in view of the responsibility connected therewith, the Government was not entitled to secure and maintain the telegraph as a source of provincial revenue; or, supposing that the returns did not cover the interest on the investment, whether the Government ought not to assume the loss, in consideration of the public benefit derived therefrom. It is to be doubted, after all, whether private parties would be likely to take up an enterprise of so novel a character; whether they could give it the same title to public confidence; or whether they could, so efficiently as the Government, protect it against wanton or malicious injury.

There has been considerable difficulty in preparing the estimate herewith annexed, and there are several of the rates which we state with great diffidence; yet, on the whole, we apprehend that the general charge will be found adequate to meet the several heads of expenditure.

It will be necessary to make some further explanatory remarks upon the various charges, which, it will be seen, refer—1st, to the apparatus and the wires; 2nd, to the posts which sustain the wires; and, lastly, to the salaries and office expenditure.

The system which we advise for adoption in New Brunswick is that of Professor Morse, of New York. His method is not only cheaper than all the others, but likewise excels them in the important peculiarity which it offers of *registering upon paper* all Telegraphic communications.*

It would be only fair to Professor Morse to ascertain how far the adoption of his system in this country, without reference to him, would prejudice his rights. At all events, we are not now prepared to recommend any system which does not *register upon paper* the Telegraphic dispatch.

We suggest that a double circuit should be established in the first instance, and that this be attempted with two wires only, the earth being, by a peculiar arrangement, rendered available in both circuits. If a third wire, or other circuits, were found to be necessary, they could be added at any time, and at an outlay for the wire only.

The estimate has been made out for a line of 65 miles, which, we believe, is the length of the route to St. John, by the valley of the Nerepis river; and we have preferred the present highway to any other line, because it is already well cleared of trees, and, therefore, less likely to endanger the wires and posts by "windfalls," &c. A shorter line through the woods might, no doubt, be found; but, in such a rough country, and in such a tempestuous climate, it would be liable to accidents which would be always difficult to detect, and almost impossible speedily to repair. On the present highway the wires would always be under inspection, and there would be no difficulty in proceeding with any occasional repairs.

* See a description of the American Electro-Magnetic Telegraph by A. Vail, Philadelphia, 1845.

By the route proposed, the wires would keep the right bank of the river St. John as far as the Falls, where nature has very greatly favoured their transmission across the river to the city of St. John.

We suggest that posts, eight inches square below, six inches square above, and about twenty feet long, with a board capping (to prevent the lodgment of water or ice about the wires) and strongly braced, and loaded with two or three tons of stone, should be set upon the ground, at distances not exceeding 200 feet apart. Where the ground is favourable for sinking, the posts might be set in the ground, but it would be necessary to enter them to the depth of five or six feet, a cross sill having been previously fixed at their lower extremity, to prevent the disturbing action of the frozen soil upon them.

Where the posts are thus sunk, we conceive that a considerable saving might be effected in the estimated charges for scantling, for framing, and for loading with stones.

Whatever method of securing the posts is adopted, it must never be forgotten that their stability and sufficiency are of paramount importance.

It would seem, at first sight, that metallic tubes placed under ground would be safer and better conductors of the wires; but the expense of trenching, and the difficulty of seeing and remedying defects, forbid their adoption in the present case.

If the telegraph was adopted by Government, and put under the control of the Post Office authorities, we imagine that the requisite accommodation for the apparatus might readily be found in their offices, at the respective termini; and the charges for transmission of correspondence and intelligence need not exceed the average rate under the present method.

The salary of the Chief Superintendent of Construction ought not to be less than 500*l.*

His familiarity with all the chemical and mechanical details must be undoubted; while his personal presence on the line would be continually required, and no portion of the work could be completed without his most thorough supervision and warranty. The above charge need not, however, become a permanent one, although those for the clerks and messengers undoubtedly would remain. The clerks would have to acquire a familiarity not only with the telegraphic characters, but also with the details of the galvanic battery and register.

The estimated average cost per mile of this line is considerably greater than that which has been adopted as the ground of action elsewhere; but it does not at present seem possible to establish a double circuit in this province at any thing so low as 41*l.* per mile.

All which is most respectfully submitted by Your Excellency's most obedient and humble servants,

J. Robb, M.D.,
J. B. Toldervy, M.D.

To His Excellency Sir Wm. M. G. Colebrooke, K. H.,
Lieutenant Governor, &c. &c.

Estimate of Charges in establishing and maintaining, for one year, an Electro-Magnetic Telegraph between St. John and Fredericton.

130 miles (for two circuits) of prepared copper wire, at £12 10*s.* per mile				£1625	0	0
Delivering and fixing the wires, at 10*s.* per mile				32	10	0
Batteries, registers, and apparatus, for two stations, at £75 per station				150	0	0
						£1807 10 0
1,716 posts, 20 feet long, 8 in. × 8 in. below, and 6 in. × 6 in. above, with two cross-sills below, 10 feet long, and 8 in. × 8 in. thick, and four braces, 7 feet long, and 8 in. × 8 in. thick, or 68 feet of scantling, at about 12*s.* 6*d.* per 100 feet (lineal measure) say	*s.*	*d.*				
	7	6				
Planing, framing, and capping the posts, say, at per foot	7	6				
Preparing ground, hauling and setting each post	3	0				
Coal tar, and painting each post	2	0				
Leading for each post, viz. two perches of stone, at 2*s.* 6*d.* per perch	5	0				
	25	0				
						2145 0 0
Salary of the Chief Superintendent of Construction for one year			£500	0	0	
Two Clerks at £200			400	0	0	
Two Messengers at £50			100	0	0	
Two Offices, rent and charges, at 40*l.*			80	0	0	
						1080 0 0
						£5032 10 0

Average cost per mile, about 77*l.*

SIR, Fredericton, February 4, 1847.

IN reply to your Excellency's note of the 30th ult., requesting us to extend our estimate for an electro-magnetic telegraph from St. John to Halifax, we beg to state for your Excellency's information, that we are inclined to believe that it might be continued at nearly the same rate of outlay as that at which we have already estimated it between Fredericton and St. John.

The distance from this place to St. John, by the Nerepis road, is sixty-five miles, or exactly one-fifth part of the distance from here to Halifax, so that the charge for establishing the whole line of telegraphic communication from here to Halifax would be somewhere near 25,000*l.*

It will be seen that our estimate for this distance is as great as that assumed by the parties in Quebec, as sufficient for the whole line from Quebec to Halifax; but we frankly avow our inability to reduce it to a figure so low, and we doubt whether they can have taken up the details of the subject with sufficient accuracy. They also seem to think that a short saving of distance by the Metis road and the Gulf shore might induce them to carry a line in that direction; but while all the difficulties of maintaining the line in an unsettled country would thus be greatly increased, almost all the advantages of a telegraph would be lost to this province. Thus we at once decide against the feasibility of any line in the direction above referred to.

In the present state of our knowledge regarding the maximum distance to which the powers of a galvanic battery and its conducting wires are limited in practice, it would be premature to decide minutely upon the number of points or stations along the line, where it would be necessary to

take up and repeat the telegraphic despatch; but as it will always be a matter of the greatest consequence to be able to discover where interruptions have arisen, it would not be prudent to place these repeating stations more than sixty or seventy miles apart. In this view of the case, one repeating station between St. John and the Nova Scotia frontier would be sufficient; and again, another between that point and Halifax, making in all, three stations intermediate between St. John and Halifax.

The small outlay required for this undertaking, when compared with the immense advantages which must accrue from it, seem to warrant us in the belief that it might be proceeded with immediately. If there was a line of railway actually in existence, no doubt the telgraphic line would accompany it; but as many years must elapse before the railroad is completed, it becomes a matter of consideration whether the telegraph should be doomed to the inevitable delay to which the other is obviously subject; and again, were the present plan adopted, the commercial advantages of the telegraph would be at once secured at places which the line of railroad might not probably approach.

All of which is most respectfully submitted by your Excellency's most obedient and humble servants,

J. Robb,
J. B. Toldervy.

To His Excellency Sir Wm. M. G. Colebrooke,
&c. &c. &c.

Reports of Mr. Wilkinson, on Electro-Magnetic Telegraphs and Railways in the United States.

May it please Your Excellency, Fredericton, February 24, 1847.

In obedience to an instruction communicated to me, at the instance of Your Excellency, on the 8th ultimo, that I would take the opportunity of my intended visit to the United States, to obtain for the Government such practical details respecting the construction and expense of wooden railways and the electric telegraph,, as would be likely to be useful in reference to the project of establishing the same in this province, I have, with a view to these objects, employed the necessarily short period at my command, embraced in a month's absence, including going and returning.

In order to report to Your Excellency in a manner sufficiently full and intelligible, with regard to both railway and telegraph, it is probable that a longer time will be necessary than may be desirable in relation to the telegraph separately.

As I was in fact prevented by want of time from applying to all the sources of information I should have wished to consult respecting the telegraph, I am the less disposed to speak minutely on the details of construction, or to claim for my observations generally higher authority than would be due to those of any intelligent observer of what is passing amongst our neighbours, during an excursion of a few days through the most populous, active, and improved parts of their country. I therefore beg Your Excellency's permission the more generally to treat of this object, and to report on the other separately, and with the more particular consideration which, I trust, it will be found to claim.

The magnetic telegraph is now so well established, and its results have

become so divested of uncertainty, that it can no longer be considered as a subject belonging only to the progressive investigations of science. Like other high achievements which have preceded it, it is now in full energy, exerting and daily extending its influence upon the affairs and relationships of communities and of the world, but more than all others does it exhibit a capacity of rapid and universal extension.

In the year 1844 the first American line of telegraph was completed by Professor Morse, of the United States, under the sanction of Government, and extended between the cities of Washington and Baltimore, a distance of forty miles. This experimental line fulfilled all that was promised by its projector; but continued the only one in operation until the spring of 1846, when, by the exertions of Joint Stock Associations, Philadelphia and New York were also connected with the cities first named; and from that time, within a few short months, the system embraces an extent of upwards of 1300 miles, connecting the following important points of the United States and Canada:—

	Miles.
From New York to New Haven, Hartford, Springfield, and Boston	265
From New York to Albany, and the intermediate places to Buffalo	507
From New York to Philadelphia, Baltimore, and Washington	225
From Philadelphia to Harrisburgh	100
From Boston to Lowell	26
From Boston to Portland, unfinished, say	55
(The whole distance is 110 miles, and all the posts are erected.)	
From Auburn (on the Albany and Buffalo Line) to Ithaca	40
From Troy to Saratoga	31
From Buffalo, U.S., to Toronto, in Canada	125
	1374

In addition to these, besides several contemplated inferior lines, a principal one of nearly 1400 miles is represented as already contracted for, and most probably is in progress, extending from Washington, by way of Charleston and Mobile, to New Orleans. In fact no schedule of telegraphic lines can now be relied upon for a month in succession, as hundreds of miles may be added in that space of time. So easy of attainment does such a result appear to be, and so lively the interest felt in its accomplishment, that it is scarcely doubtful that the whole of the populous parts of the United States will, within two or three years, be covered with a telegraphic net-work, like a spider's web, suspending its principal threads upon important points along the sea-board of the Atlantic on one side, and upon similar points along the Lake frontier on the other. The experiment has proved that no important intelligence of general interest could touch any one point, but that, if need be, it would be instantly and simultaneously understood at every other point of such a system. This is assuming, however, that a net-work so liable to derangement by accident or by wanton injury, is at the moment in perfect working order. It is found not to be exempt from such occasional derangement; yet that the defect is, in most instances, such only as may be speedily detected and repaired. The whole range of wire being exposed to observation along a public way, it can be examined nearly as rapidly as the inspector can travel by the ordinary modes of conveyance adapted to such way.

This difficulty is therefore not considered of much weight against the more important recommendations of the telegraph as at present constructed. It is besides surrounded by the moral and social protection of a well-un-

derstood common interest and benefit; so that a wilful injury to the telegraph would bring upon its author, if detected, besides the proper civil penalty, also the disgrace which would be due to an odious offence against the public.

The confidence in the efficiency of telegraphic communication has now become so established, that the most important commercial transactions daily transpire, by its means, between correspondents several hundred miles apart. Ocular evidence of this was afforded me by a communication a few minutes old between a merchant in Toronto, and his correspondent in New York, distant about 632 miles. The advantages of this rapid mode of communicating and of spreading intelligence, are also not less experienced by other classes, and especially by the farmer, who can thus, as promptly as the merchant, avail himself of a knowledge of changes in the market. This effect was remarked after the arrival of the "Hibernia" last month, with heavy orders for agricultural produce, and the news of the scarcity in Great Britain, Ireland, and elsewhere. Within four days from the time of the steamer having touched at Boston, and almost as soon as the news could ordinarily have reached them, the farmers from the interior of the State of New York, informed of the state of things by the magnetic telegraph, were thronging the streets of Albany with innumerable team-loads of grain, whilst the freight-trains of the railways from thence to New York and to Boston, were wholly inadequate either to the conveyance of the accumulating supply, or to meet the urgent demands at the shipping ports.

From such general facts alone it may be inferred that the extension of the magnetic telegraph between important points, has not only so far been practically advantageous and successful, but, on the great lines at least, financially a good investment. The profits, in fact, are represented to exceed, on some lines, the expectations of the projectors; but no authentic statements, I believe, have yet been put forward. The first dividend publicly declared on telegraphic stock is said to be on behalf of the New York and Buffalo Company, being 3 per cent. for the first four months—from 7th September, 1846, to 7th January, 1847. It must be understood, however, that the right of the patentees is agreed at one-half, whence the dividend of 3 per cent. to the stockholders is only half the actual profit. This right does not at present extend to the British provinces; yet all lines established in the latter would undoubtedly more or less contribute to the profits of those lines which are beneficial to the patentees. The claim of the American patentees is chiefly, if not solely, to the mode of registration, which, because more simple, efficient, and certain than European modes, has been altogether adopted in the United States. But another mode is, I believe, before the public, claiming the superiority of legibly printing at once, on slips of paper, the ordinary letters of the alphabet, instead of the substitutes of lines and dots.

To this assumed improvement, however, Professor Morse has himself devoted much study; and, though he admits it to be practicable, does not acknowledge it to be susceptible of equality with his telegraphic alphabet for the purpose of rapid communication; and that such improvement can *besides* be attained only at the expense of simplicity, and consequently in*creased risk of derangement* in the mechanism employed. For these *reasons he considers it* unlikely to supersede the register at present in use.

There is, however, another difficulty in the way of adopting different modes of registration, not very dissimilar to that of the break of gauge on railways; wherever it occurs a certain delay must be the consequence. No doubt a method of printing the letters of the Roman alphabet at once, if unattended with any serious practical objection or difficulty, would be preferable to any other, and it would be desirable that its adoption should be general. But when a different system, answering so well, has already been widely extended, some time would be necessary to effect a change. Within the British provinces, where telegraphic communication has only commenced, any approved method might be adopted with less disadvantage, as only one point of communication, that by way of the Niagara, with the whole American system, would perhaps be established for some years to come. At that point only would the interruption and retransmission of each communication be necessary, but would unavoidably incur serious delays when communications should follow each other in uninterrupted succession, unless the two modes of registration were equal to each other in point of dispatch. The accumulation of delay would vanish in the proportion that this equality should be attained; and when perfected, the inconvenience would be reduced simply to the loss of time incurred by each retransmission.

With regard to the method and the expense of construction of lines of telegraph, the extensive demand in the United States has there created a class of persons who have acquired skill and experience which enable them to contract at a moderate rate for lines of any extent, including all materials, excepting the registers and batteries, which make comparatively a small part of the whole cost of a long line. The New York, Albany, and Buffalo line is reputed to be one of the most efficient in the United States. From such information as I deem to be reliable, the portion of this line between New York and Albany was constructed by sub-contractors at about 125 dollars per mile, including all materials, with two copper wires of 100 lbs. each to the mile.

A line between Halifax and Quebec, along the only post road at present in use, 668 miles, estimated at the same rate, would cost as follows:—

Construction, 668 miles, at 31*l.* 5*s.* per mile	£20,875
Equipment say 10 telegraphic stations, requiring for each two registers at 11*l.* 5*s.*; two receiving magnets at 5*l.*	325
	£21,200

To the above must be added the expense of cutting down trees which may be likely to fall within range of the wires. On the whole line of the St. Lawrence, from Quebec to River du Loup, the road passes through cleared country. A very large proportion of the remainder of the line to Halifax is also cleared; but an examination would be necessary in order to judge safely of the expense of clearing away such trees and such portions of the forest as might interfere with the wires.

I am personally ignorant of the character of the land route from St. John to Halifax; but, assuming the obstacles on an average on that portion of the line not to exceed the same from River du Loup to St. John, I should conceive that it would, by judicious arrangements, cost less than 5000*l.* to remove the whole; and that this sum, with the view to an approx-

imate estimate, may be assumed as a maximum. This would make the total cost of the line 26,200*l.*

The expense of working in an efficient manner may be approximately estimated as follows: say for four principal and six intermediate stations . Office rent, stationery, fuel, light, salaries of a superintendent, four operators, four assistant operators, six operators at intermediate stations, messengers, &c.	£3,810
The annual expense of battery kept in active operation	250
Interest on capital, 26,200*l.*, at 6 per cent.	1,572
Travelling expenses, repairs, and contingencies	1,368
	£7,000

The number of intermediate stations suggested may not at all times be so much demanded by the telegraphic business at those points, as by the efficient preservation of the line in working order, and the promptitude they will afford in detecting and repairing injuries. They may also beneficially promote, through the interior country, an intelligent appreciation of the merits of the telegraph, and create a common interest in the security and perfect working of the line at all times.

In order to judge of the extent of business necessary to yield a revenue equivalent to the above expense, the tariff of the New York, Albany, and Buffalo Line, may be taken as a guide. (Copy annexed.)

Assuming that the telegraph shall be in operation 300 days in the year, then 188 communications per day, or equal to 94 in each direction, of not exceeding 15 words each, transmitted the whole length of the line, or 134 communications per day, or equal to 67 in each direction, if exceeding 15 words each, transmitted the whole length of the line, charged at the rate of 2*s.* 6*d.* each for the former, and 3*s.* 6*d.* each for the latter, for transmission and delivery, would be necessary to yield the required revenue; that is to say, without reliance upon profits from the intermediate stations, yet which may prove to be of importance.

In order to estimate the time which the transaction of the above extent of business would occupy at each of the extreme stations, we may take the 94 communications from each to be composed of 7050 characters; which, at the rate of 80 characters per minute, would require 88 minutes for the transmission, an equal time being simultaneously occupied for writing out and delivery. But a skilful operator can transmit on emergency 100 to 120, or even more characters per minute, or equivalent to the above 7050 in about an hour.

Gentlemen engaged in mercantile affairs in the principal sea-ports of the British provinces, are the most competent judges whether the average of about one hour per day be the extreme probable employment that will be given to a line of telegraph capable of transmitting in both directions, when connected with Montreal and Toronto, almost instantaneous intelligence between all those places and the several ports of the Atlantic coast; from the Gulf of St. Lawrence to the Gulf of Mexico. Also rendering the arrival of a British packet at Halifax equivalent in the effect of the intelligence with which she may be charged, to her arrival at New Orleans, and at every telegraphic station, nearly at the same time; and again, her departure from Halifax to Europe, equivalent, in point of intelligence, to her departure, nearly at the same instant, from all the important points of North America.

With regard to the time that would be necessary for the construction of a line of telegraph between Quebec and Halifax, all the poles might be deposited in their places, and all materials be nearly in a state of readiness before the present frost be out of the ground; after which the progress of the work will depend much upon the arrangements made and the force employed. If so desired by the respective provincial legislatures, and the gentlemen who may actively interest themselves in the accomplishment of the object, and provided the necessary exertions be ordinarily prosperous, the whole line may be fit for the transmission of intelligence by the end of July next.

I have estimated for the cost of a line by way of the post road at present used by Her Majesty's mails, chiefly because the route appears to offer facilities for the prompt construction, and afterwards for the management and preservation, of the line, at materially less expense than seems to be practicable by any other route, whether shorter or longer, no other being as yet so well settled or free from natural obstacles. The opening of any other and more eligible line is merely a question of expense. The difference with respect to local objects would be comparatively small.

	Miles.
1. Say distance from Quebec, viâ Fredericton and St. John, to Halifax . .	668
Add a branch from the Bend of Petitcodiac, extending through Miramichi to Bathurst	138
	806
2. Say distance from Quebec, viâ Metis, Campbelton, &c., to Halifax . .	657
Add a branch from the bend of Petitcodiac to St. John and Fredericton .	158
	815

If I may be permitted to express an opinion as to the reason assigned for preferring a line remote from the American frontier, I should say that it is in a material degree founded in misconception. From the observations already made, it is manifest that there is and must be a common interest in the security and success of such a line, as the principal or trunk line of the most rapid communication between the whole of this continent and Europe. Our interest in partaking freely of the advantages of the whole American system cannot be less important to us than a like interest in our system to them.

For the present the British mail is transported through New England to Montreal, but the establishment of railway communication for the same object through the provinces, will no doubt embrace also the means of telegraphic communication. Yet, independently of this, it is true with regard to both the immediate and prospective importance of a line of telegraph by way of the Metis, that it holds out the recommendation of touching at several ports along the eastern coast between Quebec and Halifax, and thus promises to benefit in a high degree the shipping and commerce of the river and gulf of St. Lawrence, whilst the distance being nearly the same, the heavier cost of constructing and protecting the line, might not, upon investigation, seem to outweigh its advantages; and if once in operation, the same consideration of utility would tend to ensure its permanence, even after a more direct line along the route of the railway may be established. Should the coast line, therefore, be at all events preferred in Canada, these may be reasons for concurring in its adoption.

In the mean time, it is our obvious policy to inspirit and advance our frontier population by the encouragement amongst them of every judicious enterprise that may tend to such a result.

All which is with great deference submitted.

I have the honour to be, Sir,
Your Excellency's most obedient humble servant,
J. WILKINSON.

To His Excellency Col. Sir W. M. G. Colebrooke, K. H.
&c. &c. &c.

OFFICE OF THE NEW YORK, ALBANY AND BUFFALO TELEGRAPH COMPANY.

Utica, September, 1846.

RATES OF CHARGES.—For the transmission and writing out of every communication of *fifteen words* or *under* (every figure or character beyond the address and signature being counted as a word), viz.:—

For any distance—			
Not exceeding 50 miles . .	15 cts.	for every additional five words or under,	10 cts.
Over 50 and under 150 miles,	25 cts.	,, ,, ,,	10 cts.
Over 150 and under 300 miles,	35 cts.	,, ,, ,,	15 cts.
Over 300 miles	50 cts.	,, ,, ,,	20 cts.

Exclusive of the charge for delivering communications, which in cities and villages will not exceed two cents each.

REGULATIONS:—1. *First come, first served.* 2. *Payment in advance.* 3. Communications to be written in plain copy, and handed to Manager. 4. No one to occupy more than fifteen minutes, whilst others are waiting. 5. No talking allowed in the Operator's Room during business hours. 6. No admission in the Operator's Department without special permission.

Communications destined for any place beyond the termination of the telegraph, or branching off from any station, will be faithfully written out at the last station, and put into the United States mail.

THEODORE S. FAXTON, *President.*

C. LIVINGSTON, *Secretary.*

TABLE OF DISTANCES BY TELEGRAPH.

From New York to Troy and Albany, 180 miles.

From Troy and Albany to Utica,	100 miles . .	280 miles distant from New York.	
Utica to Syracuse .	. 50 ,, . .	330 ,, ,,	,,
Syracuse to Auburn	. 26 ,, . .	356 ,, ,,	,,
Auburn to Rochester	. 78 ,, . .	434 ,, ,,	,,
Rochester to Buffalo	. 75 ,, . .	509 ,, ,,	,,

(Supplementary.)

Since closing the foregoing Report, I have, at Your Excellency's request, perused the report and estimate of Doctors Robb and Toldervy, dated on the 25th ultimo, with regard to a telegraphic line between Fredericton and St. John. In their report generally I entirely concur, excepting with regard to the expense of constructing the line mentioned. In the absence of other data for their guidance, they have very properly, and of necessity, founded their estimate upon the circumstances of perfect novelty and inex-

perience involved in the undertaking in this province. They have consequently assumed to be necessary to the efficiency of the telegraph certain precautions, materially enhancing the cost, which experience in the United States has proved to be dispensable.

1. The insulating of the extended wire (except at the points of suspension.)

2. The bracing, framing, planing, ballasting, &c., of the poles.

It is found to be sufficient to use a simple pole of oak, hemlock, pine, spruce, or hackmatack, in its rough state, with the branches merely trimmed off, and measuring about 30 feet long, 8 inches diameter at the butt, and 4 to 6 inches at the top. This is inserted in a hole about 5 feet deep, made by a boring tool contrived for the purpose. Such poles may be obtained in this province, delivered where required, at from 8*d.* to 1*s.* 3*d.* each, according to situation.

The additional expense of Kyanizing or Paynizing might be advisable. The expense of the former process, which is found to be efficient, is about equal to 2½*d.* currency per cubic foot. It would probably enhance the cost of the poles about 50*s.* or 60*s.* per mile.

Whilst the experiment was yet untried in the United States, Professor Morse estimated the expense of constructing a line on poles at 350 dolls. to 400 dolls. per mile; but, including everything, the actual cost of the line between Washington and Baltimore largely exceeded this estimate; involving as it did numerous expenditures of an experimental character. Profiting by the experience thus obtained, and by still more extended trials, it is now found practicable in the United States to construct an efficient line at the comparatively trifling cost exhibited in the estimate which I have submitted to Your Excellency.

I believe it would not be found difficult to contract with competent persons in the United States to construct a long line at that rate, but probably for a short one a higher rate might be demanded.

J. Wilkinson.

Report to His Excellency Sir W. M. G. Colebrooke, K.H., &c. &c. &c., on some of the results of experience in the United States, with regard to the use of Wood in the construction of Railways, and with reference to the construction of similar Works in the Province of New Brunswick, by J. Wilkinson, of Sur. Gen. Department, N.B.

Fredericton, 17th March, 1847.

May it please Your Excellency,—

Agreeably to the instructions communicated to me by direction of Your Excellency on the 8th January last, I have now the honour to submit such observations on railway experience in the United States as may be useful in this province.

The pressure of time on this occasion does not permit me to treat the subject either as fully, or with so much care, as I should otherwise desire. But any further information in my power to communicate is at Your Excellency's command.

In the construction of public works, it is doubtless the wisest policy to have regard to the utmost degree of perfection consistent with circum-

stances and a well-considered economy. Hence the costly degree of perfection generally exhibited in such works in Great Britain and other portions of Europe, and also in the older parts of the United States, where population, trade, manufactures, and wealth are so largely disproportionate to the corresponding circumstances here. For this reason there are but few of the more perfect models which we are competent in all respects to imitate. We can understand and profit by the same principles, but the same details of application are, as a general rule, not expedient.

But it does not necessarily follow that we must wait until our social condition be advanced to that of older countries, in order to enjoy, in many respects, equally the advantages of science and mechanical skill in our public works. We are, on the contrary, surrounded by inducements and by natural advantages, which, though associated with some difficulties, hold out the promise of ample success to well directed industry and enterprise, even with very moderate extraneous aid.

The enormous expense of the first railway experiments in England for the transport of both passengers and freight, did not divert our neighbours on this side of the Atlantic from the incalculable advantages which were assured by an improvement so great and so peculiarly adapted to this continent. On the contrary, they immediately began to consider the means within their reach of securing its benefits. They had the advantage of experience, purchased so liberally by British enterprise, and also natural advantages of their own, not available in England. In New England, indeed, where population, wealth, and local circumstances amply justified the attempt, railways were begun and finished very closely after the English model. But in South Carolina, where the abundance of timber and the favourable character of the country naturally suggested the idea, timber foundations, and also rails essentially of timber, were adopted to obviate the costly alternatives of earthen excavations and embankments, solid masonry, and the heavy iron rail.

A line of this kind was constructed between Charleston and Augusta, 136 miles, within the years 1830 to 1833. Descriptions of the road, more or less particular, are given in some of the published official reports in relation to the work, on the authority of which I believe that dependence may be placed.

The result appears mainly to have fulfilled the expectations of the projectors, leaving no material difficulty to be provided for besides the consequence of the perishable quality of the structure, which was well understood and anticipated. It was necessary that all the timber should be periodically renewed, or that permanent earthen embankments and masonry should be supplied. The latter alternative was adopted, and the road being in full operation afforded facilities for embanking which rendered the cost comparatively light. But it does not appear from the experiment, that had any certain means of *preventing the decay* of the timber been known and made use of, that any necessity for embanking would have arisen for an indefinite period, if at all.

The manner of construction was, upon well-driven piles when the ground was soft, upon trestles when firm and solid, and simply on longitudinal under-sills united by cross-ties, when excavations occurred, or where the grades coincided nearly with the natural surface.

Besides the exceedingly small expense, the advantages of this method in

superseding, to a great extent, the necessity of bridges, culverts, and drains, and in avoiding the disasters which are so liable to be the result of any insufficiency in these structures, appear to have been very deserving of notice. The adaptation of the plan to large portions of this province, and to similar descriptions of country everywhere, will appear by the following extract from the Report of the Commissioner of the South Carolina railroad, dated May 1st, 1838, being after the first year of trial of that road:—

"The plan adopted in the construction has been peculiarly fortunate; it has been emphatically called the 'Inland Bridge'—recently it has proved itself so. At a time when every mail teemed with accounts of the disasters occasioned by the late heavy freshets; when the Savannah river rose higher than it has done since the memorable Yazoo freshet; when serious apprehensions were at one time entertained for the safety of the Augusta bridge; when the houses in Hamburg were encompassed by water, and all communication between Hamburg, Augusta, and Barnwell Court House was suspended for three days, and resumed on the fourth at the risk of losing the mail and the lives of those intrusted with its conveyance; when the navigation of the rivers was stopped, their banks strewed with fragments of houses, mills, &c.; the highland roads washed into gullies, and the bridges in the low countries in many places washed away—at this period, so destructive to property, and when intercourse between various parts of the country was entirely stopped, it will be gratifying to stockholders to learn, that, with the exception of the sliding of the side of a bank on the road (avalanche) within two miles of Hamburg, the works have not sustained injury to the amount of five dollars. *During this whole period the trips were performed regularly in the usual time and with the usual load, and the passengers experienced no inconvenience,* except that resulting from a moist atmosphere. Had the system of embankment, which is generally resorted to in similar works, in order to preserve the grade over low grounds, been adopted in this work, it is probable that a large portion of it this day would have been a mass of ruins; as human sagacity could scarcely have anticipated the necessity of culverts sufficiently capacious to have afforded an outlet to such immense and overwhelming floods."

But the security afforded under such circumstances as the foregoing is not the only benefit likely to be derived from the same plan in a climate where deep and drifting snows threaten to interrupt, if not to prevent railway communication for several months in the year. So plainly essential to the success of a railway are certainty and regularity of communication, that without some satisfactory assurance that these are attainable at a limited and reasonable expense, the prudence of embarking in such an enterprise might be justly questioned. When, however, uninterrupted transportation may appear to be feasible by a plan not only avoiding extraordinary outlay, but requiring even a less expense for the whole construction and management than by any other, its claim to consideration in these colonies seems to be such as will scarcely be overlooked. Such plan appears to be that of an open wooden structure, elevated above the ordinary level of the snow, and presenting slight obstruction to the same in a drifting state. There are questions of detail in relation to this object which may for the present be deferred.

After an eight years' trial of their system, the President of the South

Carolina Railroad Company, in a Report dated in 1840, thus speaks of its merits:—

"The superiority of the peculiar construction of our road—the superstructure on piles driven into the ground and embanked afterwards—was shown very satisfactorily in the repairs after the great flood of the Savannah river in May last, which raised the water five feet over the top of the rails, yet not one-fourth thus covered were removed; and had it not been for the great weight of timber, houses, and whole trees, which were forced against it with great violence, no part would have been dislodged from its foundation.

"The plan, regarded by many as a great mistake in the building of the road, has proved an economical one, as well in repairs as original construction."

The following is from a semi-annual Report in 1843:—"The construction of the road on piles is becoming more in favour with others, as well as those having the advantage of it. Several roads at the North are partially on this plan. The New York and Erie railroad, to be 446 miles long, is to be about one-half built in this way. Over 70 miles of piles have been already driven.

"It saves much of the cost of embanking a road by being able to transport the earth upon it to fill the valleys and swamps, and before it is necessary to do this, the income of the road is providing for the payment while it is constructing.

"It preserves the line and level of the road after the embankment is made. When roads are built on fills and cuts without piles, the superstructure is continually liable to be disturbed by the sinking of the banks, or water settling in the excavations much to the injury of passing trains, breaking axles, and otherwise deranging the machinery of the engines."

The same Report furnishes a statement of the cost of the road, from which it appears that, for the wooden structure and materials, it amounted to 584,542 dolls. 43 cents; or equal to 4,300 dolls. per mile, exclusive of iron and spikes for the plate rail, which amounted to 125,309 dolls. 47 cents, or about 921 dolls. per mile. Preliminary expenses, surveys, engineer department, workshops and materials, machinery, engines, cars, inclined plane, land, road police, office expenses, &c., amounted to 241,296 dolls. 47 cents; or equal say to 1,774 dolls. per mile.

The road continued in active operation as thus constructed until 1836, when heavy repairs became necessary. At this time, therefore, the whole expense of the construction of the road, exclusive of the *iron rail* and the other expenses above enumerated, was no more than 4,300 dolls. or 1,075*l.* Halifax currency, or about 896*l.* sterling per mile; and including everything, only equal to about 1,460*l.* sterling per mile, under the unfavourable circumstances of a first experiment.

Afterwards the replacing of such timber as had begun to decay, the embanking of the piled portions of the road, and importing heavy flanged iron, increased the whole cost to 2,506,762 dolls. 61 cents, or equal to 18,432 dolls. per mile, up to the year 1839. Since then the increase of cost appears to be upwards of one-half more. But how this arises, or for what reasons the Company may have deemed it necessary or expedient so largely to increase their permanent expenditure, are questions which do not seem to be involved in that under consideration. It appears that during

a period of at least four years the advantages of a railway were obtained and enjoyed for the small expenditure before stated; but afterwards that the progressive reconstruction of the work, at heavy expense, became necessary. It is therefore chiefly desirable to ascertain whether the same advantages might not have been secured for a much longer, or even for an indefinite period, without further extraordinary expenditure, or any serious practical objection to the plan itself, had the material employed in the first construction been *imperishable.*

The opinion of engineers of long-known ability and experience in the United States, as well as of others practically conversant with the subject of railways, is that there is no valid objection to a properly constructed wooden foundation, except *the perishable nature of the material.* That as a general rule, to which all must assent, the introduction of perishable materials into works intended to be permanent, is as much as possible to be avoided; and at the present time wherever the means can be commanded, earthwork and masonry are generally preferred. Under different circumstances, however, and where wood is abundant, the piling system is adopted, if the character of the country will permit; for besides being more rapidly executed, it is regarded as an efficient and economical foundation, even at the risk of a periodical renewal every five or six years.

In some of the substantially constructed railways of New England, small portions founded wholly on wood are to be met with, and which have been so constructed either from the necessity of the case, or from some consideration of present economy. In passing over these the passenger is unconscious of any transition from the earthen foundation.

I was kindly invited to pass over and examine, in company with the engineer, a portion of wooden foundation adopted on a branch railway from Salem to Danvers, just completed and opened for traffic. It had been thus constructed with a view to despatch and the more immediate benefit of the railway, leaving the filling up with earthwork to future convenience before the wood should have time to decay. The elevation of the work, substantially constructed on piles, is from five to thirty feet above the natural surface of the ground. During the passage of the train no vibration or unsteadiness was perceptible; and in standing upon the platform behind the last car, as it were in mid air, and in clear view of the open wooden framework below, retreating with a velocity of 25 miles per hour, it was not easy to conceive how it could be more difficult to pass any ordinary depth of our northern snow, and that at rates of speed equal to those attainable under the most favourable circumstances.

The expense of this wooden structure was from two dollars to six dollars per running foot of the railway. But besides the great elevation of the way, a large proportion of the piles were driven to a great depth and in deep water. At two dollars per foot, for which a portion of this example was made, the cost would be equal to about 2,180*l.* sterling per mile, the elevation being about 10 feet, and the piles driven to a depth of 12 feet. The timber was here, however, comparatively expensive, being obtained from a distance, and as an article of merchandise.

I was favoured in a very obliging manner with the opportunity of inspecting the result of a wooden structure on the New York and Erie railroad, which is of the broad gauge, and intended as one of the great trunk

lines of the lake and western trade. The portion to which I have reference is near its commencement, and consists of a viaduct 60 feet at its highest part above the bed of the valley over which it passes. Thirty feet of this height consists chiefly of an earthen embankment, and partly of a stone bridge; but in order to avoid the delay and immediate expense of so heavy an embankment as that which would be required for the whole elevation, the remaining 30 feet was filled up with strong trestles of white oak. At the time of my visit this had been subjected to a regular traffic of upwards of five years, and still remained strong, steady, and sufficient. But in order to provide against the certain effects of gradual decay the whole structure was in progress of being embanked with earth to the level of the roadway. Earthen embankments had also been made on this division of the road wherever the timber structure had in the first instance been employed. But I was assured by the engineer of the work that no practical or efficient objection existed to this kind of foundation, except that of the perishable nature of the material, and that notwithstanding this objection, where wood was abundant, the plan was the most easy and rapid of execution, as well as in the first instance the most economical, and in a climate where communication was liable to be impeded by snow, it was superior to any other that had been devised.

A large portion of the line of the New York and Erie railroad, where the country was favourable, has been piled; but the financial difficulties of the Company having caused a suspension of their works until recently, they will be deprived of much of the benefit of the wooden structure. It has been exposed to decay during several years, but will still afford the foundation of a railway, which besides sustaining a regular traffic in the mean time, will facilitate the substitution of earthen embankments in an economical and expeditious manner.

A practical exposition of the merits of this system is afforded by the following extract from the evidence of one of the intelligent and experienced engineers of the New York and Erie railroad, as given before a Committee of the Legislative Assembly of the State of New York, appointed to investigate the affairs of the Company, in the year 1842:—

"Question 23.—Have you made or examined any tests with the view of ascertaining the *comparative merits* of a railroad constructed upon *piles*, and one upon a bed of earth or stone, and if so, state the conclusions to which you have arrived, with the facts connected therewith?

"Answer.—I have made numerous examinations relative to the construction of railroads upon *piles* within the last three years, and have become thoroughly convinced that the piling system is an important improvement in railroad construction, and especially in *northern climates*, where *severe frosts* and *deep snows* are common in the winter months.

"A road resting upon white oak piles (from eleven to eighteen inches in diameter), driven to a depth of *five* feet or over, and in all cases reaching a solid foundation, and sawed off two or three feet above the surface of the earth, is not liable to derangement by *frost*, nor obstructions by *snow*, and combines in a greater degree than any other mode that has been adopted in this country, *cheapness* and *permanency*—the two most essential requisites in railroad construction. Piles that have stood in the most exposed situations on the Utica and Syracuse railroad for the *four* past winters, and those driven on this division during the summer and fall of 1840,

in every variety of *soil*, abundantly prove the fact that *frost* cannot displace them, if they are driven to a depth of *five* feet or over.

"A piled road is also free from the obstructions and dangers incident to a graded (earthen) road, in consequence of the washing of the banks by floods and rain, and by *settling* when on a *soft* bottom; thereby requiring constant *annual expense* to adjust the road and replace the earth material.

"It will, I think, also lessen if not entirely prevent the frequent accidents that occur on graded (earthen) railroads, arising from cattle and other animals obstructing the track when trains are passing at high rates of speed.

"The permanent and uniform foundation that a piled road affords durin all seasons of the year, cannot, I think, be too highly appreciated; and for roads calculated to transport heavy freight, its decided superiority over the usual modes of constructing railroads in the state cannot be questioned.

"From the experience afforded me during the construction of the Syracuse and Utica railroad, as well as the two past years on this division,* I have no hesitation in strongly recommending the adoption of a piled road, wherever the nature of the soil, surface of the country, and a supply of suitable timber will admit of the structure. On this division* there is being made over *one hundred* miles of *piled* road, along the valleys of the Susquehannah, Chemung, Tioga, and Canisteo rivers, of which the piles are now driven for *seventy* miles; and the eight steam pile-drivers are now in operation, driving the residue at the rate of *ten* miles per month.

"The actual cost of this piling (when sawed off in readiness to receive the superstructure) has averaged less than *two thousand dollars per mile*,† including the white oak pile timber, from eight to thirty feet in length, and from eleven to twenty inches in diameter, costing on an average about three and one half cents per lineal foot, delivered on the line of road. These piles are driven from five to twenty feet, and where required by the looseness or softness of the earth, double piles are driven to the depth of fifty feet or more, and sawed off from two to four feet above the embankment, or the natural surface of the ground.

"To have substituted a graded (earthen) road-bed in place of this *piled road* in this division would have cost not less than *four thousand dollars per mile* for the whole distance, without including the grading necessary for the piled road, when the surface of the earth requires to be excavated or embanked for the purpose of bringing the earth grade from *one* to *four* feet from the grade-line of the road. No difficulty has been experienced in driving white oak, chestnut, or Norway pine piles below the reach of the *frost*, in sand, gravel, clay, or alluvial soils; and wherever excavations or embankments occur exceeding four feet in depth or height, the cost of removing the additional quantity of earth necessary for a graded road-bed, with its side ditches, *exceeds* the cost of piling, including the piling timber.

"The excavations for piled road on this division are made twelve feet wide on the bottom, with side slopes of one foot vertical to one and a half feet horizontal. The piles are sawed off one foot above the bottom of the cut, and a ditch of three feet wide and one foot deep is made between the rows of

* Susquehannah division of the New York and Erie Rail-road.

† Say equal to 417*l.* sterling.

piles, to carry off the water. The earth from the excavations is carried into embankments, where the grade exceeds three feet in height. The embankments are made to within three feet of the tops of the piles, twelve feet wide on the top, with side-slopes of one and a-half feet to one foot.

"From the experience that I have had in the construction of pile road, and from the examinations that I have made relative to the cost of grading, and keeping in repair the ordinary graded roads of the country, I think I am within bounds when I say that the interest of the amount saved by building a piled road instead of a graded road, for the one hundred miles on this division, together with the annual expense in keeping a graded road-bed in good adjustment and repair, will *renew the piles*, should it be necessary, every *five* or *six* years, so long as suitable timber can be obtained at *twice* its present cost in that division.

"If the white oak piles should not remain sound more than eight or ten years, the expense of filling around them with earth, at the expiration of that time, with the use of cars to move the earth, would cost at least *fifty per cent.* less than it would now cost to make the embankments to the graded line with barrows or waggons; as most of the earth would require to be drawn from the hills for great distances, in consequence of the alluvial soil, found along the bottom lands of the rivers, not being suitable for a road bed for a graded road. Wherever the valleys to be filled are deep, and the excavations from which the earth is to be taken to embank over them, are at any considerable distance off, the hauling of the earth is postponed until the track is laid on the piles, and then done with cars at a great saving of expense.

"Another consideration in favour of a *piled road* is, that when the piles are partially decayed, the earth embankments can be *cheaply* brought up to grade, as has been shown, and the strength of the *pile* will, for many years thereafter, keep the road from settling; thus you will perceive that the superstructure having been kept from the ground, and, of course, in a great measure preserved, the earth being brought to grade, as before remarked, and well rammed under the superstructure, we have a new and permanent road, much more permanent than roads where the rail is laid upon a new, and, of course, not thoroughly settled embankment.

"The construction of pile road on this division has, I think, enabled the company to make contracts with the landholders along the route (where such road is made) for right of way, fencing and farm-crossings, for at least *seventy-five per cent.* less than they could have done had a graded road been substituted in its place. This arises from the fact that while the piles remain in good preservation, there will be no necessity of fencing along the railroad, excepting the nailing of a few boards upon the piles, while the farmer can cultivate all the land sold to the Company, and which is from four and a half to six rods in width (until it is required for a graded road), except the width of eight feet, occupied by the *piles*. The piled road also permits cattle and other animals to pass *under* the track, and thus saves the great expense usually required on graded roads to make embankments on the roads for farm crossings, or expensive bridges or culverts, to allow teams and cattle to pass under the road. A large amount is also saved in the single item of *cattle guards*, necessary on graded roads, to prevent cattle from passing from private or public roads, on to the track of the railway, and thereby obstructing the passage of

trains; and which occasions a great share of the destruction of life and property on graded roads,

"As I have before remarked, the great advantages of the *piling system* consist in its *cheapness* and *permanency;* and in regard to its *durability*, it will be seen, that if the perishable material of which it is constructed can be renewed at an expense of less than the *interest* upon the difference in the first cost, and necessary annual expenses (when compared with a graded road), it must result in an ultimate *saving of expense.*"

The substance of this testimony, received with that consideration to which the opinions and experience of other competent engineers support its claim, gives to the question of wooden railways a peculiar interest in these provinces, and places in a striking light the importance of some available method of ensuring their durability after their first construction.

The most satisfactory experiments which as yet appear to have been made in the preservation of wood, are by the process of "Kyanizing;" not that they conclusively establish the comparative merits of this process, but because they extend over a longer period of time, say than any experiments by the more recent methods which have been introduced to public notice, amongst which the most approved appears to be that of "Payzing."

No well authenticated instance is known of the failure in the United States of the Kyan process where it has been fairly tried. On the contrary, prepared railway sleepers of spruce, one of the most perishable of American woods, exposed in a manner least favourable to its durability, have been found at the end of six years, the full time of its ordinary duration, remaining quite sound and elastic, and even retaining the original marks of the saw. The cost of this process by hydraulic pressure has been found to be 5 12-100 cents, or about equal to 3 1-8*d.* Halifax currency per cubic foot. By soakage only, it ought to be much less, as the value of the corrosive sublimate necessary to each cubic foot, does not, according to some experiments, exceed 1½*d.* currency. The efficiency and economy of this process, as now confirmed by numerous experiments, has tended to create a general confidence and renewed interest in it; the risk of further trials is now freely incurred, and its extensive adoption is highly probable.

The simple process of natural absorption, by immersing the foot of a newly-felled tree in a preservative solution, say the pyrolignite of iron, seems well deserving of consideration and further experiment. By this process it would appear that the vitality remaining in the wood for a short time after it has been cut, causes the artificial fluid to circulate with the natural sap throughout the whole tree. Mr. Bethell claims a right in this process by patent, dated July 11th, 1838. Public attention was drawn to the discovery by Dr. Boucherie, of Paris, in 1840. It would, of course, be necessary that this process should be practised on the spot where the timber is cut.

It seems difficult to attach too much importance in these provinces to some feasible and certain method of rendering wood, if not imperishable, at least capable of resisting decay for a long period. The effect would be to place us in a position to prosecute a railway system, and other works, at a cost so moderate as to remove reasonable fears of success. It would probably also give us a large share of additional manufacturing benefit in the staple of the country. For the preservative process seems to be most easy and effectual when applied whilst the wood is in a *green* state.

Wood as a substitute for Iron Rails.

So far we have chiefly considered the eligibility of wood as the principal material in railway foundations. The entire substitution of wooden for iron rails, and thereby avoiding nearly the whole expense of the latter, has perhaps engaged more attention in these provinces than in the United States. On first naming the subject of wooden rails in that country, you are understood to mean the wooden rail, or longitudinal sill, upon which a light plate of iron is laid and secured, as in the first experiments there. But this expedient having been found to be very objectionable and insufficient, especially under heavy locomotives and high velocities, is generally becoming abandoned in favour of the heavy iron rail. The light iron plate of $2\frac{1}{2}$ inches by $\frac{3}{4}$ inch is found to be too flexible, and the wood beneath it too compressible. It is now deemed necessary, even with a continuous wooden bearing, that the iron should possess the stiffness of the usual forms of the heavy iron rail. The failure of the light plate rail, therefore, seems to have created a degree of prejudice against much dependence upon wood, and a dependence upon it altogether is regarded as somewhat chimerical. The results of the limited experiments in England have not apparently had the effect of disturbing in the United States the general conviction of the necessity of employing strong rails of iron in order to sustain a heavy transportation.

It may be allowed that the statements of the experiments as yet made, though calculated to give a favourable impression, do not conclusively settle the question of the safe application of the wooden rail to the various circumstances of a long line of railway intended to sustain heavy loads and high velocities. Enough, however, has been made known to draw attention in these colonies to the importance of a more perfect investigation of the subject. A few suggestions in relation to it I will venture to submit.

The principle of the wooden rail is acknowledged to be without novelty. Its employment is merely a return to what was in use upwards of 200 years ago, but now resumed under the more favourable circumstances of greatly advanced knowledge and experience. The form of the rail appears to have been not materially different from that which has been subjected to recent experiments; but the wheels of the waggons are said to have been, during a long period, only of wood, and of rude construction. Afterwards cast iron wheels were introduced, which, it would appear, from their imperfect adaptation to a rail of much softer material, soon led to the use of cast iron rails. Again a difficulty was experienced. It was found that the cast iron rails, especially *when their surfaces were narrow*, cut the rims of the iron wheels, forming indented grooves, which caused considerable friction and the frequent breaking of the rails. To remedy this *the breadth of the surface of the rail was increased*, which diminished the evil to a certain extent, but the expense of repairs was still considerable. A complete remedy was eventually effected by "*case-hardening*" the rim of the wheels in the process of casting. The further improvement of introducing malleable iron rails, was for several years retarded by the same evil which first appeared in the use of the cast iron rail; *the narrowness of the edge* being found to cut the periphery of the wheels. The cast iron rail with a broader surface was therefore preferred, because a malleable iron rail with a surface *sufficiently broad* was too costly. But eventually a malleable iron rail was

produced, the section of which presented *the same bearing surface* as the cast iron rail, combining with lightness the necessary degree of strength.*

Now it seems manifest that these progressive improvements proceeded from *a necessary regard to the relative hardness of the periphery of the wheel and the bearing surface of the rail.* Cast iron wheels were found to cut a soft material like wood, and rendered also cast iron rails *apparently* necessary. But these, when narrow, were found in return to cut the wheels, an evil which was in part remedied by making the surface of the rail *broader,* and more perfectly remedied by making the periphery of the wheel *harder.* It was also found necessary to the success of the malleable iron rail that the *breadth of bearing surface* should be adjusted to the relative hardness of the periphery of the wheel.

These considerations seem applicable to the failure of the iron plate rail spiked upon a rail of wood, as tried in the United States. It is obvious that a thin ribbon of iron, only two-and-a-half inches wide, could do no more than protect the wood from the abrasive action of the wheels. It was too narrow and flexible to prevent the effects of *compression.* Hence nearly the same result might be expected, though in a less rapid and sensible degree, as from the first experiments of narrow cast iron wheels running immediately upon wood. A thin strip of iron, subjected to the rolling action of a heavy pressure, and depending for its stiffness upon a soft and irregularly compressible bearing, must necessarily lose the essential qualities of a rail. It could not remain either uniformly plain or rigid.

For this evil there appear to be three remedies, differing materially in their relative economy.

1. An iron plate rail widened to an extent to be determined by its increased stiffness, and the hardness of its wooden bearing.

2. An iron rail of suitable form, and sufficiently stiff to compensate for its narrowness of bearing upon wood.

3. A rail exclusively of wood, to which the width of the rim of the wheels of the locomotive and of the train shall be duly adjusted.

The second of these remedies is that adopted in the United States, and which involves a minimum of expence of eight or nine thousand dollars per mile for the iron and its fastenings.

Yet without further and satisfactory experiments there seems to be no sufficient reason to doubt that nearly the whole of this outlay might be avoided by the third proposed remedy; and which is the adoption of a duly proportioned wooden rail, to be acted upon by iron wheels, *the peripheries of which shall be plain, and of a width which shall be adjusted to the weights and velocities to be sustained, and the relative hardness of the wood,* thereby obviating the necessity of a bearing surface of metal in any form. But the experiment shall include the substitution for the "flanches" now in use, either the grooved diagonal guide wheels of Mr. Prosser, or plain horizontal wheels to roll against the inner side of the rail, for the same purpose.

I would therefore suggest, in order more perfectly to test the merits of this kind of rail, that such experiments should be made as may be sufficient to determine whether its efficiency does not depend upon a due adjustment of the width of the iron periphery of the wheel as may be due to the relative hardness of the wood under the pressure of given loads, and under

* Wood's Treatise on Rail-roads, pp. 8, 13, 141, 191, 192.

the least favourable circumstances incident to railway transportation. It is probable that one result of such experiments would be to show that the diminution of the compression is nearly as the square of the ratio of the increase of the width of the periphery of the wheel, that is to say by increasing such width twice, thrice, or four times, we relieve the fibres of the rail from the compressing or crushing effect as four, nine, or sixteen times.

Further experiments appear also to be necessary in order to determine the adhesion of the driving wheel upon wood under various circumstances. It has been represented as much more than upon iron. In a dry state this is very probable; but in a perfectly wet state it is doubtful whether it will not be considerably less, and if so, the supposed advantage of being able to ascend steeper acclivities on the wooden rail may cause disappointments against which it is very material to guard. The same expedient, however, which has been beneficially adopted in the iron rail in a wet state, that of sanding, may prove to be equally or more efficacious on wood.

In the mean time there appears to be no sufficient reason to discourage a reliance upon the wooden rail under ordinary circumstances, if abundant breadth be given to the rims of the iron wheels. In the breadth of the wood a liberality can be observed, which in the use of iron is restrained to a minimum by its costliness.

In closing these imperfect observations, it may be proper, with regard to the general recommendations which they convey of wooden foundations for railways, to remark that it is not pretended that they can always obviate expensive cuttings and embankments, which must in some instance of necessity be encountered.

I have, &c.,

J. WILKINSON.

To His Excellency Sir Wm. M. G. Colebrooke,
&c. &c. &c.

Extracts from Reports of the Hon. Capt. Owen, R.N. on the Port of Whitehaven, and other Ports and Harbours on the Atlantic Coast of Nova Scotia, eastward of Halifax.

(Copy) "Columbia," Halifax, N. S., 5th September, 1846.

SIR,—Your Excellency was pleased to refer to me on the subject of the ports in the promontory of Canseau, but as the information I was then (last Wednesday) able to give your Excellency was verbal, and therefore evanescent, I have presumed it may be more acceptable in an authentic and tangible form.

My attention was directed by His Excellency Sir William Colebrooke to the necessity of making such a nautical reconnaissance of the coasts of the promontory of Canseau, as might assure us that there was at that point a safe port, easy of access, not incommoded by ice at any season, and, in short, such a port as might with advantage be used as the junction of sea and land communication between Great Britain and her colonies in North America, &c.

As I had never before visited any of the ports at that extremity of Nova Scotia, I examined (by actual visitation) Country Harbour, Torbay, Whitehaven, and the ports of Canseau and Guysboro', and reconnoitred all the intermediate shores.

There are serious nautical objections to the adoption of any of the points mentioned, which are unnecessary to detail in this communication, except only Whitehaven, of which the Admiralty charts give very good plans. Lieutenant Shortland, Commander of the "Columbia," surveyed the approaches to Whitehaven, and we gave three days to its examination.

Whitehaven is not only most conveniently situated, being the nearest approachable point of the continent of North America to England or Ireland, (in lat. 45° 10′ N., long. 61° 8′ W.,) but is a splendid and most commodious port, whose immediate entrance and its harbour are never obstructed or incommoded by drift or packed ice.

It has very great facilities of approach, and has only two outlying dangers or small rocks between the port and the open sea, and these only about half a mile from the shore; and in short, its nautical facilities of attainment greatly exceed those of Halifax, or any other point on this coast that I have seen. The upper parts of its fine and beautiful harbour (like Bedford Bason and Halifax Harbour,) in some winters freeze over in part, but never so as to obstruct its external communications, its approach, or its perfect safety; and its configuration, as regards the proximate coasts, prevents the accumulation of drift or packed ice, either to obstruct or incommode it.

Its shores offer no impediments to railroad termini, wherever convenient, and the vicinity is (in my judgment) perfectly practicable for rail communications; and if the new road from Dartmouth to Guysboro' were continued, it would bring Whitehaven within 120 miles of practical road distance; and (as I have understood) on a level so unobstructed as to invite to that direct line of railroad to Halifax from Whitehaven, should it be adopted as the sea terminus, and this distance in rail time requiring less than four hours, saving a voyage of sixteen hours under favourable circumstances; and considering the inconveniences at present existing to the nautical commodiousness of the port of Halifax in times of fog, the advantages of the shorter communication must be indefinitely manifest.

Thus, Sir John, I have certified to Your Excellency this one important fact, that at the nearest available point of North America to England or Ireland, there is a splendid port—(Whitehaven) most conveniently placed, and endowed in every way inviting to its use as the junction of sea and rail communication between Great Britain and these colonies.

I have, &c.,

(Signed) W. F. W. Owen, *Captain R. N.*

His Excellency Sir John Harvey, K.C.B., K.C.H.,
Lieutenant-Governor.

Extracts from the Reports of the Hon. Captain Owen, R.N., Marine Surveyor, relative to Whitehaven Harbour, near Cape Canseau, to His Excellency the Lieutenant-Governor of New Brunswick.

(No. 1.—Extract.)

Campo Bello, 11th September, 1846.

Sir,—By Your Excellency's suggestion, and since that, by authority of the Lords of the Admiralty, I proceeded with the "Columbia," on the first of last month, to make a nautical reconnaissance of the shores and ports of the promontory of Cape Canseau, to ascertain the most proper point or

port therein for the junction of sea and land communication between Great Britain and British North America, with reference to a former Report of mine (in November last) on this subject to Your Excellency.

In the first instance we did not stop to examine Country Harbour, conceiving that point, 1st, as too remote from the N.E. extremity of Nova Scotia, or the nearest point on this continent to Great Britain and Ireland; and 2nd, that its external dangers, with the distance of pilotage water, were irremediable obstacles to its unobstructed approach in fogs, however safe and convenient the port might be in other respects. The "Columbia" entered and reconnoitred Torbay, and found similar objections to its adoption.

On Sunday, 2nd August, she entered Whitehaven, by the western channel, and as it appeared at first view to offer all that could be required, I directed Lieut. Shortland to survey the approaches, and report to me his opinion on those and the port itself, which Report I enclose for Your Excellency's information. We found the haven to be a splendid and convenient port, as capacious as Halifax Harbour, between George's Island and Bedford Basin, and as safe and commodious, and its approaches safe and under any circumstances easily attainable from the open sea, and within the extreme points in perfect shelter and security, not being more than a mile of pilotage water; but the shaft or channel to the haven itself, although well sheltered and safe, yet it is very narrow in some places, for a distance from one to two miles, according to the channel by which entered. Mr. Shortland's plan shows all the dangers we could discover.

The haven finishes to the northward at Pleasant River, also very convenient and navigable for two miles by vessels of any burden, and for small craft two miles further still, to its head, which northern extremity is only four miles from the high road between Guysborough and the port of Canseau.

Whitehead Island, the outward point to seaward of the haven, is 140 feet high, and may be considered as the north-east extremity of Nova Scotia, and the nearest available point of this continent to the British Islands, although itself isolated. The Acadian French settlement of Molasses Harbour is separated to the westward by a very narrow isthmus of mere beach from the western part of the haven, besides which there are not now more than eight or ten establishments around Whitehaven.

Well arranged light houses and fog signals will be as necessary to the port of Whitehaven as to other ports that are much frequented. Under all circumstances and at all times a light-house on Whitehead Island will be extremely well situated for all this coast, and might be seen seven leagues. For the port of Whitehaven one harbour light on Beacon Ledge would serve for all three of the principal entrances, and fog signals might be so arranged as to lead a vessel safely through any of them in fogs.

Our inquiries relative to ice in winter were very satisfactory. Pleasant River is generally frozen all down to the haven in January and February, and in severe winters the haven has been known to be entirely frozen over, but only once known to have happened to the southward of Fisherman's Island, and the nature of the coast and entrances preclude the possibility of packed or drift ice accumulating, so that the ingress and egress is always free and open.

It is not more or less subject to fogs than the whole of this south-east coast of Nova Scotia, which is all seriously inconvenienced by this impediment to comfortable navigation; and the soundings, with attention, may

always give sufficient indication of approach, and the rocky ledges of the coast form an almost continued steep barrier of land.

It will not be necessary in this Report to explain the arrangements that may be required to facilitate the safe entrance of this port from sea in fogs. It is sufficient to say that it will admit the use of definite signals to secure at all times a safe and easy entrance.

I forward to your Excellency a trace of Lieutenant Shortland's survey of the main shaft of communication from the sea to the haven, showing the three principal passages within the anchorage, which is all safe and commodious. There are, for the convenience of small craft, four or five other small passages from the sea, on whose critical examination we gave no time.

The northern shores of the haven are everywhere safely approached and capable of maintaining good wharfs, &c.

Having satisfied myself of the eligibility of Whitehaven, we proceeded on the 6th August coasting and reconnoitring towards Cranberry Island light-house, off Cape Canseau, five leagues from Whitehead Island. We passed Raspberry Island and Harbour, Whale Island, and Big Dover Harbour and Bay, Little Dover or White Point, St. Andrew's Island or Cape Canseau proper, and entered Canseau Harbour, of old the winter rendezvous of the French navy in these seas, found most of these misnamed on the charts, and nowhere, any spot, bay, or point, that could at all compete with Whitehaven, the approaches to all being difficult and dangerous in fogs or by night.

The port of Canseau is very small, and is undergoing serious changes for want of care. The spot called Burying Island is in great part washed away, and soon will all of it be so if not protected.

The approach to it is intricate and confined, and finding, moreover, that in every spring the port of Canseau, and indeed all the bay of Chedabucto are seriously obstructed by drift ice out of the St. Lawrence, we merely measured the distance from the light-house to the outer basses, and obtained proper marks for the dangers in the direct route, and then left Canseau by the little Gut, for Guysboro', where Captain Pipon, the Commissioner, had made an appointment to meet me, and who, seeing us from heights, came on board from Fox Island, as we were passing, and we passed on to Guysboro' on the 8th August, an appropriate point for the junction of the sea route with a railroad or land communication, on any point of the shores of Chedabucto Bay, and the approach from sea is simple, safe, and easy; but it is so incommoded every spring by drift ice as to render it useless at that season for the purpose in question.

Having determined to return to Halifax, and to pass through all the sea-points with Captain Pipon on board, to enable him to see with his own eyes every one of them that could be brought in question, therefore we quitted Guysboro' on the 11th early, stopped at the port of Canseau, where Captain Pipon landed to reconnoitre for some hours, when he reimbarked. We left Canseau and coasted the outer dangers to Whitehaven, which we entered by the eastern channel. Captain Pipon from two hills reconnoitred, and we remained in the haven until next morning, the 12th August, when we quitted Whitehaven by the western channel, coasted Torbay, and proceeded along shore to Country Harbour, the channel into which is long, intricate, and in some places shallow, therefore not at all

recommendable; nor is the western or open sea-approach unobjectionable, on account of its numerous outlying dangers for nearly three leagues; and the place itself appeared to me too far removed from the north-east extremity of Nova Scotia, as before said. In the afternoon we landed Captain Pipon seven miles up the beautiful and navigable river of Country Harbour, and proceeded to Halifax in the "Columbia." We put into *Marie et Josef* in a fog on the 13th, and on the 14th coasted the outer dangers with very foggy weather, and arrived at Halifax at nine P.M. on the 14th.

I have the honour, &c.,

W. F. W. OWEN, *Captain R.N.*

His Excellency Sir W. M. G. Colebrooke, K.H.,
Lieut.-Governor.

(Copy) Columbia, Halifax, N.S., 27th August, 1846.

SIR,—In pursuance of your orders, I have made a rough sketch of the inner part of the entrance of Whitehaven, which, with the accompanying remarks, I beg to submit for your consideration.

In fine clear weather, and by daylight, the approach to Whitehaven is easy, the shores being bold and no out-lying dangers, if we except two rocks nearly a mile distant from the shores of White Island, one to the south-west, and the other to the south-east. These generally break and so show themselves.

White Island forms the turning point of the shore of Nova Scotia, as it deflects towards the northward to Canseau. The white rocks, and its elevation of 140 feet, make it stand out prominently, and easily distinguish it.

There are several channels into Whitehaven. Three can be used by steamers of any size. The middle, which is between White Island and the ledges to its westward, appears to be the best, is about 250 fathoms broad in its narrowest part, and carries bold water on both sides, and is besides the shortest and most direct, not exceeding half a mile in length. However, as the directions of the channels differ, and all radiate nearly from the same point, a sailing vessel can use that most favourable with respect to the winds. The western is also a very good channel, and is preferable for vessels going or coming from that direction. The soundings without this harbour are (near the shore) very irregular, especially in the approach to the eastern channel, which is also injured for vessels of large draught of water, by a rocky patch with thirteen or fourteen feet water. It is situated near the entrance, and rather more than one-third across channel from the small Island (Grassy Patch), off White Island.

When inside the harbour, care must be taken, as there are several shoal rocky patches (see Plan) which render the navigation difficult to strangers, and require to be well determined and buoyed, should the harbour be used for commercial purposes. There is an abundance of safe anchorage, with good holding ground, black muddy bottom, land-locked, and perfectly smooth.

In foggy weather this harbour is difficult of approach, especially to a stranger, as the soundings in-shore are very irregular; and I have not been able to learn any good indications of its vicinity to be gathered from the lead, so as to render its approach by that means certain; and Torbay, its immediate neighbour to the westward, is a dangerous place to get into.

From the fishermen and small coasters I understand the currents round the point are uncertain, and generally depend upon the wind, though the prevailing current is to the westward.

I experienced the current in a boat when I visited the outer break; it was then setting to the westward, at the rate of one and a half mile per hour at least. I also perceived vessels in the offing setting rapidly in the same direction; the breeze was from the eastward, and light, though it had previously blown hard from the same point. We also, in our passage from Halifax to Canseau, during a fog, with the wind from the south-west, experienced an easterly current; but the land once made, the harbour is easily attained, especially by a steamer.

A judicious arrangement of fog signals and lighthouses, with buoys on the principal dangers, and a good survey, with the sea soundings well laid down, would make the approach in the night or during fogs attended with small danger to a careful seaman.

Latitude of Observation Rock, Whitehaven, 45° 14′ 0″ N.
Longitude of Observation Rock, Whitehaven, 61° 11′ 4″ W.

Variation 21° 42′ 20″ W. Rise of tide from 3 to 6 feet. High water at the change of the moon, 7h. 40m.

In the Admiralty plan of this place, the general features and soundings appear correct, if we except some of the inner dangers, which are not noticed; but the scale is discrepant.

I have the honour, &c.,
(Signed) P. FRED. SHORTLAND,
Lieut. and Commander.

The Hon. W. F. W. Owen, Captain R.N.

H. M. S. "Columbia," Campo Bello, 23rd Sept., 1846.

SIR,—In referring to my report of the 11th, principally showing Whitehaven to be a port in every way calculated for the purpose designed, it has shown me that possibly there may have been some points neither so fully nor satisfactorily explained therein as might be considered desirable, and principally the deservedly high character of Halifax as a safe and convenient port, has been not unfrequently adverted to by persons not very conversant with the details of minute navigation; implying that Halifax being so safe and secure a port, it would not be prudent to establish another port, and which could not fail to be detrimental to its local interests (viz., of Halifax), and could not on their assumed suppositions be either so safe or convenient. The comparative advantages of Halifax and Whitehaven must be, in the first place, decided by their respective geographical positions, which is proved to be so much to the advantage of Whitehaven (in the only view here taken of them), that the communications between Great Britain and Halifax itself would be accelerated at least twelve hours under any circumstances, and, under some circumstances, possibly by twice, or even thrice, that difference of time.

This fact must be decisive in the mere geographical comparison. In the second place, comparing the two points nautically, Halifax is a good, capacious, fine, safe harbour; so is Whitehaven, and in nothing that I know inferior to Halifax.

In clear weather, by night or by day, both are equally available, and

equally safe and easy of approach, so that the only circumstance still open to comparison is in the too common case that at the time when entrance is sought into them respectively, all the points and the ship herself may be enveloped in a dense fog, and possibly her own jibboom end not visible—the most perplexing and appalling case in precise navigation to seamen.

In case of fog, the attainment of Halifax Harbour requires twenty miles of pilotage navigation; for Whitehaven, never more than three or four; and the last is also more surely beaconed. In truth, in the case of fogs, Halifax is difficult, and, with the loose management of modern navigators, it is dangerous; in proof of which, it is a well known fact that ships of war and others are sometimes detained outside the harbour from half a day to three days before they can effect a sure and safe entrance, and serious delay to the packets frequently occurs; besides, the known fact that one of these (the "Britannia") once narrowly escaped wreck, with serious damage, among the dangers of Sambro, at the entrance of Halifax, near six leagues from the port, and which must always be passed before that can be attained; and no longer ago than the middle of July last, the same vessel overshot the entrance to Halifax, and very narrowly escaped wreck, with serious damage, among rocks and ledges thirty miles beyond it, about Jeddore.

Both places must be subject to the casualties and accidents arising from mismanagement; but the field of occult movements, in fogs, and the sphere of uncertainty in the navigation, is full ten times greater at Halifax than Whitehaven.

At the latter I could pledge myself to direct vessels as surely and certainly to any spot within its precincts, in fogs, as by a human voice in a boat a-head of and guiding them. Nevertheless, Halifax is by no means incapable of such arrangements for foggy weather, although no such attempt hitherto can be said to have been made, and they would there also be required on a much more extensive scale than at Whitehaven.

I have, &c.,

(Signed) W. F. W. Owen, *Captain R.N.*

His Excellency Sir Wm Colebrooke, K.H.,
Lieutenant-Governor.

Table of the Portions of Time in which European Intelligence by Telegraph, and Mails, Passengers and Freight by Sea and Railroad, may reach Montreal, and *vice versâ*, from the Position at Canseau or Whitehaven, as compared with other Points of Debarkation on the Atlantic Coast of America.

For Montreal.	Intelligence by Telegraph will be delayed by intervening Time at Sea	Mails, Passengers, and Freight, will be transported by Sea and Railroad in
Debarking at Canseau, or Whitehaven, Nova Scotia	0 hours	0+25=25 hours.
,, Halifax, Nova Scotia	12 ,,	12+24=36 ,,
,, Portland, Maine	48 ,,	48+ 9=57 ,,
,, Boston, Massachusetts	52 ,,	52+11=63 ,,
,, New York	70 ,,	70+13=83 ,,

At a time when assiduous efforts in the United States are directed to the accomplishment of both telegraphic and railroad communication with Montreal, as a central point through which to draw off the trade of the Canadas

from British outlets, and by the advantages of such communication eventually to supplant British manufactures and British shipping, the above comparison with regard to a countervailing advantage of the highest importance presenting itself to British capitalists within their own territories, and under the protection of their own Government, may tend to demonstrate the practicability of securing and maintaining British commercial ascendency in the Canadas, and that a national line of railroad, projected from the nearest available point of Nova Scotia, and judiciously and energetically carried into effect, promises, as far as the Canadas are concerned, not only to perpetuate such ascendency, but also rather to benefit, by rendering tributary to a more extended commerce, all similar works in the United States.

The subject assumes unlimited interest as connected with an eventual overland communication with the Pacific, say at the rate of fourteen or sixteen days from Europe. The copper and silver mines now working and in progress of extensive discovery on Lake Superior, within the British as well as American territory, on the direct line of such communication, may tend, with other and more important causes, to accelerate the accomplishment of this design. . . . .

Report on the Forest Trees of New Brunswick, by M. H. Perley, Esq., Government Emigration Agent, January, 1847.

THE dense forests which cover a very large proportion of the surface of New Brunswick, furnish a variety of trees, which may be divided into two great classes.

The first class comprises the leafy trees, such as the Maple, Birch, Beech, and Ash; these grow on level ground, or gentle declivities, and form what are called "Hard Wood Lands." The second class consists of the resinous trees, such as Pines and Spruces, which cover the low grounds and bottoms of the valleys, forming what are called "Soft Wood Lands."

Between the parallels of 43° and 46° north latitude, these two great classes are found in nearly equal proportion; but proceeding from the 46th degree northwardly, the leafy trees become more rare, and the resinous trees more abundant. Below the 43rd degree, on the other hand, proceeding to the south, the resinous trees are found less common, and the others soon lose their predominance in the forest, by becoming mingled with the numerous species of Oaks and Walnuts.

Beyond the 48th degree of north latitude all trees become dwarfish, and but few varieties are found. From the parallel of 49°, dwarfish shrubs alone exist up to 50° north, beyond which there are only mosses and barrens across that extensive tract of country stretching from Canada to the Arctic Ocean.

The province of New Brunswick being situated between the parallels of 45° and 48° north latitude, occupies a favourable position on the continent of North America for the production of many descriptions of large and valuable timber trees, which constitute its most valuable export.

It is the object of this Report to describe these timber trees in a plain and practical manner, and to state the uses and properties of each description of wood, with reference to its value and application in commerce and the arts. . . . . .

The description will be in the order of the following classification:-

Oak (*Quercus*) Two Species.

1. Gray Oak . . . . . *Quercus Borealis.*
2. Red Oak . . . . . *Quercus Rubra.*

Walnut (*Juglans*) One Species.

1. Butternut . . . . . *Juglans Cathartica.*

Maple (*Acer*) Five Species.

1. White Maple . . . . . *Acer Eriocarpum.*
2. Red-flowering Maple . . . . *Acer Rubrum.*
3. Sugar (Rock) Maple . . . . *Acer Saccharinum.*
4. Moose Wood . . . . . *Acer Striatum.*
5. Mountain (Low) Maple . . . *Acer Montanum.*

Dog Wood (*Cornus*) One Species.

1. Dog Wood . . . . . *Cornus Florida.*

Birch (*Betula*) Four Species.

1. Canoe Birch . . . . . *Betula Papyracea.*
2. White Birch . . . . . *Betula Populifolia.*
3. Yellow Birch . . . . . *Betula Lutea.*
4. Black Birch . . . . . *Betula Lenta.*

Alder (*Alnus*) Two Species.

1. Common Alder . . . . . *Alnus Serrulata.*
2. Black Alder . . . . . *Alnus Glauca.*

Cherry (*Cerasus*) Two Species.

1. Wild Cherry Tree . . . . . *Cerasus Virginiana.*
2. Northern Cherry Tree. . . . . *Cerasus Borealis.*

Poplar (*Populus*) Two Species.

1. Balsam Poplar (Balm of Gilead) . . *Populus Balsamifera.*
2. American Aspen . . . . . *Populus Tremuloides.*

Beech (*Fagus*) Two Species.

1. White Beech . . . . . *Fagus Sylvestris.*
2. Red Beech . . . . . *Fagus Ferruginea.*

Hornbeam and Iron Wood (*Carpinus*) Two Species.

1. American Hornbeam . . . . *Carpinus Americana,*
2. Iron Wood. . . . . *Carpinus Ostrya.*

Ash (*Fraxinus*) Two Species.

1. White Ash . . . . . *Fraxinus Americana.*
2. Black Ash. . . . . *Fraxinus Sambucifolia.*

Willow (*Salix*) Three Species.

1. Black Willow . . . . . *Salix Nigra.*
2. Champlain Willow . . . . *Salix Lœustrina.*
3. Shining Willow . . . . . *Salix Lucida.*

Elm (*Ulmus*) Two Species,

1. White Elm . . . . . *Ulmus Americana.*
2. Red Elm . . . . . *Ulmus Rubra.*

American Lime (*Tilia*) One Species.

1. Bass Wood . . . . . *Tilia Americana.*

Pine (*Pinus*) Three Species.

1. Red (Norway) Pine . . . . *Pinus Rubra.*
2. Gray Pine . . . . . *Pinus Rupestris.*
3. White Pine . . . . . *Pinus Strobus.*

SPRUCE (*Abies*) Four Species.

1. Black, or Double Spruce . . .	*Abies Nigra.*
2. White, or Single Spruce . . .	*Abies Alba.*
3. Hemlock Spruce	*Abies Canadensis.*
4. American Silver Fir	*Abies Balsamifera.*

LARCH (*Larix*) One Species.

1. American Larch (Hackmatack) . .	*Larix Americana.*

CYPRESS or CEDAR (*Cupressus*) One Species.

1. White Cedar	*Cupressus Thyoides.*

GENUS THUYA—One Species.

1. Arbor Vitæ	*Thuya Occidentalis.*

OAK.

ie Oak being a native of temperate climates, is neither abundant f large size in New Brunswick. Of the forty-four species of Oak h are described as being found in North America, between the ieth and forty-eighth degrees of north latitude, only two are found ist in this province.

1. GRAY OAK.—*Quercus Borealis.*

scription.—This species of Oak is said to be found as far north as 0". In New Brunswick it seldom, if ever, exceeds forty feet in height, o feet in diameter. It blooms annually, but, from the length and ity of the winter, the fruit does not attain maturity oftener than once ee or four years.

ie name of "White Oak" is generally applied to this species, but perly, as it differs very materially from the White Oak of the United s. The largest trees of this description have hitherto been found in icinity of Grand Lake in Queen's County. A cubic foot of the Gray from that locality weighed fifty-two pounds when well seasoned.

perties and Uses.—The Gray Oak possesses great strength and dura- as well as weight; but its small size prevents its being used for r purposes for which it would otherwise be well adapted. Among armers it is greatly in request for agricultural implements, but the ipal consumption is by the carriage and sleigh makers, who esteem it highly, as do also the boat-builders.

2. RED OAK.—*Quercus Rubra.*

scription.—This is a tall wide-spreading tree, of larger size than the Oak, and it is found further north than any other Oak except the r. Its leaves are smooth and shining on both sides; in the autumn change to a dull red, and turn yellow before they fall. The acorns arge and abundant, rounded at the summit, compressed at the base, ontained in flat cups, covered with narrow compact scales. They are iously devoured by wild animals, and by cows, horses, and swine, ranging the woods after the herbage has perished.

perties and Uses.—The wood of the Red Oak is reddish and coarse ed, and the pores are often large enough for the passage of a hair. tolerably strong, but not very durable, and it is chiefly used for the

staves of barrels and casks in which to contain dry wares. A cubic foot of this wood, felled in the vicinity of the Grand Lake, when well seasoned, weighed forty-four pounds. A cubic foot of English Oak, when seasoned, weighs from fifty to fifty-four pounds.

WALNUT.

Only one species of the Walnut is found in New Brunswick, which is well known by the name of Butternut. It is abundant on the rich alluvial banks of the St. John, and nowhere more plentiful than in the vicinity of Woodstock, and from thence to the Begaguimick river. The Butternut is also found in several parts of the province, on uplands of a moderate elevation possessing a deep rich soil, which are thence called "Butternut Ridges," and are noted for their fertility.

BUTTERNUT.—*Juglans Cathartica.*

Description.—In favourable situations, the growth of the Butternut tree is very luxuriant, frequently attaining the height of eighty feet, and the diameter, at four feet from the ground, of six to eight feet. The roots of a large sized tree, often extend even with the surface of the ground, in a serpentine direction, and with little variation in size, to the distance of forty feet. The trunk ramifies at a small height, and the branches, seeking a direction more horizontal than those of other trees, and spreading widely, form a large and tufted head, which gives the tree a remarkable appearance.

The fruit is commonly single, and suspended by a thin, pliable footstalk, about three inches in length; its form is oblong oval, without any appearance of seam. It is often two and a half inches in length, and five inches in circumference, and is covered with a viscid adhesive substance, composed of small transparent vesicles, which are easily discovered with the aid of a glass.

The nuts are hard, oblong, rounded at the base, and terminated at the summit in an acute point, their surface is very rough; deeply and irregularly furrowed. They are ripe in New Brunswick in October, and in some seasons are so abundant that one person may gather several bushels of them in a day. The Indians, in former times, pounded and boiled the kernels, and separating the oily substance which swam upon the surface, mixed it with their food. These kernels are very oily, and hence the name of "Butternut."

When the fruit has attained about half its growth, it is sometimes used for making pickles, being first plunged into boiling water, then thoroughly wiped to clean it of its down, and afterwards preserved in vinegar.

If the trunk of the Butternut is pierced in the month which precedes the unfolding of the leaves, a pretty copious discharge ensues of a slightly sugary sap, from which, by evaporation, a sugar is obtained of a quality but slightly inferior to that of maple sugar.

Properties and Uses.—The Latin specific name, *Cathartica*, was long since given to this species of Walnut, by Dr. Cutler, of Massachusetts, and Michaux says, should be definitively substituted for that of *Cinerea*, by which it has been heretofore distinguished by botanists. This last appella-

tion, derived from the colour of the secondary branches, whose bark is smooth and grayish, suggests only an unimportant characteristic; while the first expresses one of the most interesting properties of the tree. An extract of Butternut bark in water, or even a decoction sweetened with honey, is acknowledged to be a very excellent cathartic. Its purgative operation is stated to be always sure, and unattended, in the most delicate constitutions, with pain or irritation.

On a live tree, the inner bark, when first exposed, is of a pure white; in a moment it changes to a beautiful lemon colour, and soon after to a deep brown. The bark of the Butternut tree is very commonly used in the country for dying yellow, and many fine trees are annually destroyed by the recklessness of the backwoodsmen, who strip the bark from the trunk for this purpose.

In those parts of the United States where the Black Walnut is found, the Butternut is distinguished by the name of White Walnut. When young, the Black Walnut and the Butternut resemble each other in their foliage, and in the rapidity of their growth; but when arrived at maturity, their forms are so different as to be distinguished at first sight. Remarkable peculiarities are also found on examining their wood, especially when seasoned. The Black Walnut is heavy, strong, and of a dark brown colour; while the Butternut is light, of little strength, and of a reddish hue; but they possess in common the great advantage of lasting long, and of being secure from the ravages of worms.

The wood of the Butternut Tree will long resist the effects of heat and moisture. On the Ohio, it is sawn into boards for the construction of small skiffs, which, on account of their lightness, are in request for river navigation. It is also used for the panels of coaches and carriages, for which it is found well adapted, not only from its lightness, but because it is not liable to split, and receives paint in a superior manner. For corn-shovels and wooden dishes, it is preferred to the red-flowering Maple, because it is lighter and less liable to split.

Very considerable quantities of furniture are now made at Fredericton of Butternut wood, which is becoming in great request for a variety of purposes. For wainscotting, and for fitting up libraries, it is well adapted, being easily worked, of a pleasing colour, and susceptible of a good polish, which throws out the graining, and shows the wood to advantage. The wood of the Butternut tree has also been recently employed in the private chapel at the Government House, and for the highest order of architectural finishing at St. Anne's Chapel, in Fredericton; all the wood-work in the interior, and the beautiful arches and ceiling of that tasteful building, being formed exclusively of the Butternut. It may there be seen under very favourable circumstances, and cannot fail to be admired.

Butternut wood has not yet become an article of export from this colony, but the large size of which it can be procured, and its various good qualities, which have only recently become known, will soon render it in demand. The propagation of this tree is very easy, either from cuttings or from the nut; and as it grows to the greatest advantage in pastures and along the sides of roads, it would be advantageous to farmers to cultivate it, as well for the beauty of the tree itself, and the fruit it produces, as for the value of the wood at maturity.

MAPLE.

The Maples, in general, are lofty and beautiful trees, deciduous, and sufficiently hardy; they grow quick, are easily transplanted, and bear cropping. The grass flourishes under their shade. They prefer a free, deep, and loamy soil; rich, rather than sterile, and neither wet nor very dry. The situation that suits them best, is one that is sheltered and shady, rather than exposed. They are seldom found on the north side of lofty mountains, or on mountains at all, except among other trees; but on the plains they are found by themselves.

The wood of the Maples differs so widely in quality in different species, that it is difficult to characterize it by general observations.

Maple wood speedily ferments and decays when exposed to the weather. It is liable to be injured by worms, and hence is unfit for building. It possesses, however, other qualities which, in part, compensate for these defects, and which render it useful in the arts, and in domestic economy.

1. White Maple—*Acer Eriocarpum.*

Description.—The trunk of the White Maple is low, and divides itself into a great number of limbs, so divergent that they form a very spacious head. It is pinched by the rigorous winters of New Brunswick, and never reaches the size which it attains further south.

The leaves are opposite, and supported by long footstalks; they are divided by deep sinuses, into four lobes, and are toothed on the edges, of a bright green on the upper surface, and of a beautiful white beneath. The foliage is scattered, and leaves an open thoroughfare to the sunbeams. Though the White Maple will not grow in swamps, yet it attains its greatest dimensions on the alluvial banks of rivers which are occasionally inundated; and it is worthy of remark, that it is found on the banks of such rivers only as have limpid waters and a gravelly bed.

The White Maple blooms early in the spring; its flowers are small, with a downy ovarium. The specific name, *eriocarpum*, is derived from the Greek, *erion*, cotton, and *carpos*, fruit, in allusion to the down which grows on the fruit.

Properties and Uses.—The wood of the White Maple is very white, and of a fine grain; but it is softer and lighter than that of any other species of the Maple, and from its want of strength and durability, is but little used. When dry, it weighs thirty-eight pounds to a cubic foot, and in seasoning loses nearly half its weight. As it soon changes colour, it is not much used for cabinet work. The charcoal made from it is esteemed for yielding a strong uniform heat of long continuance.

The sap of the White Maple is in motion earlier in the spring than in the Sugar Maple. Like the Red Maple, it yields but half the product of the Sugar Maple from a given measure of sap, but the unrefined sugar is said to be whiter and more agreeable to the taste than that of the Sugar Maple.

The inner bark of the White Maple rapidly produces a black precipitate, with sulphate of iron.

2. Red-flowering Maple—*Acer Rubrum.*

Description.—Whether in flower or in foliage, the Red Maple, like its

congeners, is a beautiful tree. Although it neither attains the size nor the height of the Sugar Maple, it much resembles that tree in its general appearance, but it may easily be distinguished from it by its trunk, the bark on which, when young, is perfectly smooth, and more profusely marked with broad, pale yellow lichens. In open situations, it often ramifies at the ground, and assumes the form of several small trees growing in a clump.

The *Acer Rubrum* grows on the borders of creeks, but chiefly in swamps which are frequently inundated, and always miry, and there only it attains its full dimensions. It is sometimes called "Soft Maple," and "Swamp Maple," but that of "Red-flowering Maple" is most general, and also most appropriate, as the young shoots, the flowers, and the fruit are red.

The first tree whose bloom announces the return of spring is the Red-flowering Maple. In 1846, it was observed in flower near St. John, on the 20th April. The blossoms, which are of a beautiful purple, or deep red, unfold more than a fortnight before the leaves. The fruit is of the same hue with the flowers, though it varies in size, and in the intensity of its colouring, according to the exposure and the dampness of the soil. The extremities of this tree, which are formed by numerous twigs united at the base, have a remarkable appearance when garnished with flowers and seeds of a deep red, before vegetation has begun generally to revive.

The leaves are smaller than those of the White Maple, but in some respects they resemble them. They are whitish underneath, and are divided in three or four acuminated lobes, irregularly toothed.

Properties and Uses.—The wood of the Red-flowering Maple, when dry, weighs forty-four pounds the cubic foot; when green, it is soft, full of aqueous matter, and loses in drying nearly one-half of its weight. It is harder than the wood of the White Maple, and of a finer and closer grain; hence, it is easily wrought in the lathe, and acquires by polishing a glossy and silken surface.

In the United States, the wood is principally employed for the lower part of Windsor chairs. It is also used for spinning-wheels and saddle-trees, and in the country is preferred for yokes, shovels, and wooden dishes.

It sometimes happens in very old trees that the grain, instead of following a perpendicular direction, is undulated; and this variety bears the name of "Curled Maple." This singular arrangement, for which no cause has ever been assigned, is never witnessed in young trees, nor in the branches of such as exhibit it in the trunk. It is also less conspicuous at the centre than near the circumference. Trees offering this disposition are rare, and do not exist in the proportion of one to a hundred. The serpentine direction of the fibre, which renders them difficult to split and to work, produces, in the hands of a skilful mechanic, the most beautiful effects of light and shade. These effects are rendered more striking, if, after smoothing the surface of the wood with a double-ironed plane, it is rubbed with a little sulphuric acid, and afterwards anointed with linseed oil. On examining it attentively, the varying shades are found to be owing entirely to the inflexion of the rays of light, which is more sensibly perceived in viewing it, in different directions, by candle-light.

Before Mahogany came into such general use, the wood of the red-flowering Maple was much used for furniture; bedsteads are still made of it, which in richness and lustre excel the finest mahogany. It is now sawn

into thin plates (veneers), which are used to inlay other woods in articles of cabinet work, and the finishing of ships' cabins.

The Red-flowering Maple never produces the variety known as "Bird's-eye Maple;" that is confined exclusively to the Sugar or Rock Maple.

The inner bark of the Red-flowering Maple is of a dusky red. By boiling it yields a purplish colour, which, on the addition of sulphate of iron becomes a dark blue, approaching to black. It is used in the country with a certain portion of alum in solution, for dyeing black.

The wood of this Maple is inferior to that of Rock Maple for fuel.

The French Canadians call this tree *Plaine*. They make sugar from its sap, but, as in White Maple, the product of a given measure is only half as great as is obtained from the Rock or Sugar Maple.

3. Sugar Maple—*Acer Saccharinum.*

Description.—This is the most interesting of the American Maples, and is called Rock Maple, Hard Maple, and Sugar Maple. The first of these is most generally used; but Michaux uses the last, as indicating one of the most valuable properties of the tree. It enters largely into the composition of the forests with which New Brunswick is covered, where it is found of the largest size and in great perfection.

The Sugar Maple frequently reaches the height of seventy or eighty feet, with a proportional diameter; but it does not commonly exceed fifty or sixty feet, with a diameter from twelve to eighteen inches. Well-grown, thriving trees are beautiful in their appearance, and easily distinguished by the whiteness of their bark. The natural *habitat* of the Sugar Maple is the steep and shady banks of rivers and elevated situations, where the soil is cold and humid, free, deep, and fertile, and not surcharged with moisture.

The leaves are about five inches broad, but they vary in length according to the age and vigour of the tree. They are opposite, attached by long footstalks, palmated, and unequally divided into five lobes, entire at the edges, of a bright green above, and glaucous or whitish underneath. In autumn, after the appearance of the first frost, their colour changes from green to all shades of red, from the deepest crimson to light orange. At first the leaves at the extremities of the branches alone change their colour, leaving the internal and more shaded parts still in their verdure, which gives to the tree the effect of great depth of shade, and displays advantageously the light, lively colouring of the sprays. Later in the season, when the tints become more and more gorgeous, and the full beams of the sunshine fall upon the large masses of foliage, the warm and glowing colours of the whole summit possess a great deal of grandeur, and add much to the beauty and effect of the landscape.

Mr. M'Gregor, in his work on British America, speaking of the forests, says, "It is impossible to exaggerate the beauty of these forests; nothing under heaven can be compared to its effulgent grandeur. Two or three frosty nights in the decline of autumn transforms the boundless verdure of a whole empire into every possible tint of brilliant scarlet, rich violet, every shade of blue and brown, vivid crimson, and glittering yellow. The stern, inexorable fir tribes alone maintain their eternal sombre green; all others, on mountains or in valleys, burst into the most glorious vegetable beauty, and exhibit the most splendid and most enchanting panorama on earth."

Properties ' ***Uses.***—The wood of the Sugar Maple when first cut is white, but af being wrought, and exposed for some time to the light, it takes a rosy ti . Its grain is fine and close, and when polished it has a silky lustre. It is very strong, and sufficiently heavy, but wants the property of durability; when exposed to moisture it soon decays, and is therefore neglected in civil and naval architecture. For many purposes, however, it is preferred to Beech, Birch, or Elm; but it should be perfectly seasoned, which requires two or three years.

The wood of the Sugar Maple grown in New Brunswick, when dry, weighs forty-six pounds to a cubic foot; that grown to the southward of New Brunswick weighs much less. It furnishes the best fuel in the province, and its ashes are rich in the alkaline principle. Four-fifths of the pot-ashes exported from Boston and New York to Europe are made from this Maple. The charcoal made from it is preferred to any other; it is one-fifth heavier than the coal made from the same species of wood in the middle and southern States, a fact which sufficiently evinces that the Sugar Maple acquires its characteristic properties in perfection only in a northern climate.

There is a great resemblance in appearance between the wood of the Red-flowering Maple and that of the Sugar Maple; but the latter is easily distinguished by its weight and hardness. There is, besides, a very certain and simple test. A few drops of sulphate of iron (copperas) being poured on samples of the different species, the Sugar Maple turns greenish, and the White Maple and Red-flowering Maple change to a deep blue.

The Sugar Maple exhibits two accidental forms in the arrangement of the fibre, of which cabinet-makers take advantage for making beautiful articles of furniture. The first consists in undulations, like those of the Red-flowering Maple, and is likewise known as "Curled Maple;" the second, which takes place only in old trees that are still sound, appears to arise from an inflexion of the fibre from the circumference toward the centre, producing spots of half a line in diameter, sometimes contiguous and sometimes several lines apart. The more numerous the spots, the more beautiful and the more esteemed is the wood; this variety is called "Bird's-eye Maple." It is now beginning to be exported in very considerable quantities to the United Kingdom, where it brings a high price; and as its value is becoming more generally understood, it is to be hoped that hereafter it will not be so lavishly cut and wasted by the lumberers and backwoodsmen as has heretofore been the case.

The ancients held the Maple in great esteem, and tables inlaid with curious portions of it, or formed entirely of its finely-variegated wood, in some instances brought their weight in gold. To such a height did the fondness of the Romans for curious woods carry them at one period of their history, that their tables were even more expensive than the jewels of their ladies. Maple dishes are frequently mentioned by the Latin poets; and Cowper and many modern poets also mention bowls of Maple as being used by shepherds and hermits. Virgil celebrates the Maple as the throne of the "good Evander," and its branches as the canopy under which he received and seated Æneas.

> "On sods of turf he sat the soldiers round;
> A Maple throne, raised higher from the ground,
> Received the Trojan chief; and o'er the bed
> A lion's shaggy hide for ornament they spread."

Pliny gives an elaborate account of the uses and properties of Maples; he enumerates ten different kinds which were known in his time.

Besides the varieties of "Curled Maple" and "Bird's-eye Maple," two other varieties occur in the wens or excrescences which grow on the trunk of the Sugar Maple. The most valuable of these is known by the name of "Variegated Maple Knob," or "*Loupe d'érable de couleurs variées*," of the French. It presents an assemblage of shades agreeably disposed, sometimes resembling Arabic characters, which renders the wood exceedingly appropriate for fancy work, and from its scarcity it commands very high prices. The other variety, known by the name of "Silver White Maple Knob," or "*Loupe d'érable blanc argenté*" of the French, exhibits a silvery lustre, and is highly prized for the same purposes as the preceding, although more common.

The Indians of New Brunswick have been accustomed to make their dishes of these Maple knobs from time immemorial, and they still continue to use them, for, with ordinary care, they last a very long time. Some of these rude dishes, when finished and polished by an experienced workman, are exquisitely beautiful, and worthy a place among the most rare and costly specimens of wood.

THE MANUFACTURE OF MAPLE SUGAR.

The extraction of sugar from the Maple is a valuable resource in a country where all classes of society daily make use of tea and coffee.

The process by which it is obtained is very simple, and is everywhere nearly the same. Though not essentially defective, it might be rendered more perfect and more profitable by a little more attention to science.

The work usually commences in the month of March, while the cold continues intense, and the ground is still covered with snow. The sap begins to be in motion at this season, nearly two months before the general revival of vegetation.

A sufficient number of Maple trees being found growing in close proximity to each other, the ground is occupied by a party, and is termed a "Sugarie;" and those who first commence tapping the trees, consider that possession for one year constitutes right for those years that follow. Without having any tenure of these lands from the Crown, these parties often receive consideration from others for the right of possession.

In a central situation, convenient to the trees from which the sap is to be drawn, a rough shanty is constructed, called a "Sugar Camp," to shelter those who attend the kettles from the weather. The articles required are, axes to cut and split fuel, kettles of fifteen or twenty gallons capacity, an auger of three quarters of an inch diameter, numerous small troughs to receive the sap, slips of wood* or tubes, eight or ten inches long, corresponding in size with the auger, buckets for emptying the troughs and carrying the sap to the camp, a tree hollowed out, or large tubs, to receive the sap as brought in, from which to supply the kettles, and moulds to receive the syrup when sufficiently boiled to form into cakes.

The trees are perforated in an obliquely ascending direction, eighteen or

* These slips of wood are generally made of Sumach (*Rhus Coccinea*), or Elder (*Sambucus Canadensis*).

twenty inches from the ground. Care should be taken that the auger does not enter more than half an inch within the wood, as experience has shown that the most abundant flow of sap takes place at that depth. It is also recommended that the tree should be tapped on the south side, but this useful hint is not always attended to.

The troughs, which contain two or three gallons each, are made of Birch bark, Pine, Spruce, or Fir; one of these is placed on the ground at the foot of each tree. The sap is collected every day, and temporarily poured into casks, or more frequently a large trough, made of a Birch tree hollowed out like a canoe. The evaporation is kept up by a brisk fire, night and day, and the scum is carefully taken off during this part of the process. Fresh sap is added from the reservoir as required, and the heat is maintained until the liquid is reduced to a syrup, after which it is left to cool, and then strained through blanket, or other woollen stuff, to separate the remaining impurities.

Some persons recommend leaving the syrup in this state twelve hours, before boiling it for the last time, others proceed with it immediately. In either case the kettles are only half filled, and by an active, steady heat, the syrup is rapidly reduced to the proper consistency for being poured into the moulds. The evaporation is known to have proceeded far enough, when upon rubbing a drop of the syrup between the fingers it is perceived to be gramular. The molasses being drained off from the moulds, the sugar is no longer deliquescent, like the raw sugar of the West Indies.

If the syrup is in danger of boiling over, a bit of lard or butter is thrown in, which instantly calms the ebullition. The larger the boiler the more sugar is obtained from it. A copper vessel affords a sugar of a fairer colour than an iron vessel. The sugar is lighter coloured in proportion to the care with which it is made, and the judgment with which the evaporation is conducted. When refined it equals in beauty the finest sugar consumed in Europe.

The sooner the sap is boiled the better. It should never be kept longer than twenty-four hours. Lime, eggs, or new milk, are mixed with the boiling sap to clarify it. A spoonful of slaked lime, the white of one egg, or a pint of new milk, are the usual proportions to fifteen gallons of sap; the latter is esteemed the best, but clear sugar may be made without any of these.

The sap continues to flow for six weeks, after which it becomes less abundant, less rich in saccharine matter, and sometimes even incapable of crystallization. In this case it is consumed in the state of molasses, superior to that from the West Indies, and bears the name of "Maple Honey."

After three or four days exposure to the sun, Maple sap is converted into vinegar by the acetous fermentation.

The Indians of New Brunswick have practised sugar-making time out of mind, and the Acadian French have pursued it from their first settlement in America. The French of Madawaska still make several thousand pounds annually; in fact, they make nearly all they consume, and some seasons have a considerable surplus for sale.

The amount of sugar manufactured in a year varies from differ ca
A cold and dry winter renders the trees more productive than a c le
and humid season. When frosty nights are followed by dry and wa
days, the sap flows abundantly; and from three to five gallons are t

yielded by a single tree in twenty-four hours. Three persons are found sufficient to attend 250 trees; each tree of ordinary size yields, in a good season, twenty to thirty gallons of sap, from which five or six pounds of sugar are made, but the average quantity, in ordinary seasons, is about four pounds to each tree.

It has been remarked, that in districts which have been cleared of other trees, and even of the less vigorous Sugar Maple, the product of the remainder is proportionally more considerable. In all sugar plantations, therefore, it will be advantageous to cut out the different sorts of timber which grow intermixed with the Sugar Maple, and even such of that species as are not thriving trees. The timber so cut out will serve as fuel for the boilers, and leave openings for the sun to enter, which will improve and enrich the sap.

Trees which grow in low and moist places afford a greater quantity of sap than those which occupy rising grounds, but it is less rich in the saccharine principle. That of insulated trees, left standing in the middle of fields, or by the side of fences, is best. A farmer in the United States, who has planted these trees in his meadow, obtains each year one pound of sugar from every three gallons of sap.

Wild and domestic animals are immoderately fond of Maple sap, and break into enclosures to sate themselves with it.

4. Moose Wood—*Acer Striatum.*

Description.—In New Brunswick, and the other British Provinces, this Maple is known only by the name of Moose Wood; in the United States it is called Striped Maple.

The name of Moose Wood was given it by the first settlers, from observing that the Moose subsisted during the latter part of winter and beginning of spring upon its young twigs. In New Brunswick it is found most vigorous in what is called a "mixed growth," where the woods are composed of Sugar Maple, Beech, Birch, and Hemlock Spruce. In these forests it constitutes a great part of the undergrowth; its ordinary height is ten feet, though individual trees are found more than twenty feet. The trunk and branches of the Moose Wood are clad in a smooth, green bark, longitudinally marked with black stripes, by which it is easily distinguishable at all seasons of the year.

This species of Maple has long been cultivated in Europe, in parks and extensive gardens. It is in request as one of the earliest trees to feel the approach of spring, but more particularly on account of the pleasing effect of the white veins which variegate its trunk. In the primitive forests, where it grows beneath a canopy of impervious shade, these veins are black; the change of colour seems owing to its being planted in drier soil, more open to the sun.

Properties and Uses.—The small size of the Moose Wood forbids its use in any kind of construction; but as it is white and fine-grained, cabinet-makers sometimes employ it in forming the white lines with which they inlay mahogany.

Its principal advantage to the inhabitants consists in furnishing them, at the close of winter, when their forage is exhausted, with a resource for sustaining their cattle till the advancing season has renewed the herbage. As

soon as the buds begin to swell, the famished horses and neat cattle are turned loose into the woods to browse on the young shoots, which they consume with avidity. Poor as this resource may appear it is not wholly inadequate, as the twigs are tender and full of saccharine juice.

5. Mountain Maple—*Acer Montanum.*

Description.—This diminutive species of Maple is abundant in New Brunswick. It is sometimes called Mountain Maple, and sometimes Low Maple. Though the last of these names indicates the stature of the tree, Michaux retains the first, which is in most general use, and likewise most appropriate, as this Maple (unlike any of the other species) grows in preference on the declivities of mountains, exposed to the north, and in cool, moist, and shady situations, on the abrupt and rocky banks of torrents and rivers.

The Mountain Maple seldom exceeds fifteen feet in height, but it blooms at an elevation of six or eight feet, and even less. It most frequently grows in the form of a shrub, with a single, straight, slender stem, covered with a smooth, whitish bark, and sending forth several red branches.

Properties and Uses.—This species of Maple is too small to afford wood of any value, and is noticed in this Report merely to complete the series of the species.

DOG WOOD.

The genus *Cornus* consists of deciduous trees and shrubs, all in general very hardy, and easily propagated from seeds by suckers, or by cuttings and layers. Among the eight species of Dog Wood which have been noticed in North America, one species alone is considered entitled, from its size, to be classed with the Forest Trees. It is the most interesting, too, from the value of its wood, the properties of its bark, and the beauty of its flowers.

Flowery Dog Wood—*Cornus Florida.*

Description.—When grown under favourable circumstances, the Flowery Dog Wood forms a tree, attaining a height of thirty to thirty-five feet, with a trunk nine or ten inches in diameter; but, in general, it does not exceed one-half of these dimensions. The trunk is strong, and is covered with a blackish bark, chopped into small portions, which are often in the shape of squares, more or less exact. The branches are proportionally less numerous than on other trees, and regularly disposed nearly in the form of crosses. The young branches are observed to incline upward in a semicircular direction. The leaves are oval, of a dark green above, and whitish beneath. Towards the close of summer they are often marked with black spots, and at the approach of winter they change to a blood red. The flowers, which appear in May, or early in June, while the leaves are only beginning to unfold themselves, are yellowish, and collected in bunches, which are surrounded with a very large involucre, composed of four large white floral leaves, sometimes inclining to violet. This fine involucre constitutes the chief beauty of the flowers, which are very numerous, and which,

in their season, robe the tree in white, like a full blown apple tree, and render it one of the fairest ornaments of the American forests.

The berries, which are of a vivid glossy red, and of an oval shape, are always united. They remain upon the tree until the first autumnal frosts, when, notwithstanding their bitterness, they are devoured by the robin (*Turdus Migratorius*) and other small birds.

Properties and Uses.—The wood of the Flowery Dog Wood is hard, compact, heavy, and fine-grained: it is susceptible of a brilliant polish. The sap-wood is perfectly white, and the heart-wood is of a chocolate colour.

This tree is not large enough for works which require pieces of considerable size; it is used for the handles of light tools, such as mallets, chisels, and the like. In the United States some farmers select this wood for harrow teeth, for the hames of horses' collars, and also for shoeing sled-runners; it is also used for the cogs of mill-wheels: but to whatever purpose it is applied, being liable to split, it should never be wrought until it is perfectly seasoned.

The shoots, when three or four years old, are found suitable for the light hoops of small casks; and the divergent branches are used for the yokes which are put on the necks of swine, to prevent their breaking into enclosed fields.

The arrows of the Indians were formerly made of Dog Wood, as were also the spears of the ancients, by whom this wood was held in high esteem. Virgil speaks of it—

"*bona bello*
Cornus."

The berries dye purple; the inner bark, which is extremely bitter, has proved an excellent substitute for the Peruvian bark.* The bark also may be substituted for galls in the manufacture of ink.† From the bark of the more fibrous roots the Indians obtain a good scarlet dye.

Such are the profitable uses of this tree, which merits attention from the value of its wood, its useful properties, and especially for the beauty and brilliancy of its flowers, by which it is better adapted than almost any other of the North American trees, for the embellishment of extensive gardens and pleasure grounds. In England it is cultivated solely as an ornamental shrub; but from its large white flowers, "emulous of the purity of snow," which finely contrast with the "forest green," it is said to deserve richly a place in every collection where it will thrive.

* Dr. Walker, of Virginia, in an inaugural dissertation on the comparative virtues of the Cornus Florida, Cornus Sericea, and Cinchona Officinalis of Linnæus, after detailing a great number of experiments, remarks, "A summary recapitulation of these experiments shows that the Cornus Florida, Sericea, and Peruvian bark possess the same ingredients, that is, gum, mucilage, and extracts, which last contain the tannin and gallic acid, though in different proportions. The Florida has most of the gum, mucilage, and extracts; the Sericea the next, which appears to be an intermediate between the Florida and Cinchona; while the latter possesses most of the resin. Their virtues appear similar, and equal, in their residence. The extract and resin possess all their active powers. The extract appears to possess all their tonic powers. The resin, when perfectly separated from the extract, appears to be purely stimulant; and probably the tonic powers of the extract are increased when combined with a portion of the resin, as in the spirituous tincture."

† The following is given as a receipt for making good ink:—"Put half an ounce of Dog Wood bark, two scruples of sulphate of iron, and two scruples of gum Arabic, into sixteen ounces of rain-water; during the infusion shake it repeatedly.

BIRCH.

The northern extremities of the old and new Continents appear to have what may be considered the native climate of the Birch, to judge from the number of species found there, and which diminish in proceeding to the south. To the inhabitants of these regions the trees of this genus are highly interesting, and are applied by them, with wonderful ingenuity, to the necessities of life. They employ the wood in the construction of houses and of vessels, and in the works of the wheelwright and the cabinet-maker; of the bark, which is nearly incorruptible, they make canoes, boxes, and more secure covering for their habitations; with the leaves they dye their nets, and from the sap they procure a mild and sugary beverage.

From the researches of botanists it appears that as many species of Birch are found in North America as in Europe; and Michaux the younger states that, from his own observations on the comparative properties of their wood, the advantage appears to lie solely on the side of the American species. The Canoe Birch, he says, equals the White Birch which grows in Sweden and in Russia; and the Black Birch and Yellow Birch far exceed it in the strength and beauty of their wood, as is proved by the several uses to which they are applied.

The four species of Birch found in New Brunswick are all tall trees; they are known at first sight by the white or silvery colour of their bark, or rather of the *epidermis*, or outer thin covering of the bark, by the smallness of their leaves in comparison with other timber trees, and by the lightness and airiness of their whole appearance.

1. Canoe Birch—*Betula Papyracea.*

Description.—By the French Canadians this tree is called *Bouleau blanc*, White Birch, and *Bouleau à Canot*, Canoe Birch. It is known in New Brunswick also by these denominations, and sometimes by that of "Paper Birch," but that of "Canoe Birch" has been deemed most proper, as indicating an important use made of the bark.

The Canoe Birch is most multiplied in the forest of North America, in that portion lying north of the 43rd degree of latitude, and between longitude 75° west, and the Atlantic Ocean; this portion, though situated ten degrees further south, is said very nearly to resemble Sweden and the eastern part of Prussia, not only in the face of the country but in the severity of the climate. Below the 43rd degree of north latitude the Canoe Birch is not found. It attains its largest size, which is about seventy feet in height and thirty inches in diameter, on the declivity of hills and in the bottom of fertile valleys. Its branches are slender, flexible, and covered with a shining brown bark, dotted with white. The twigs are erect in young trees, but being very slender and pliant, are apt to become pendent in old ones; hence a very beautiful variety, nearly equal in gracefulness to the drooping Elm.

Properties and Uses.—The heart or perfect wood of the Canoe Birch, when first laid open, is of a reddish hue, and the sap-wood is perfectly white. It has a fine glossy grain, with a considerable share of strength; that it is little employed, is owing partly to its speedy decay when exposed to the succession of dryness and moisture, and partly to the existence in its vicinity of several species of wood, such as the Maples, the Beech, and even

the Yellow Birch, which are far preferable for the uses of the joiner and the wheelwright.

A section of the trunk of this tree, one or two feet in length immediately below the first ramification, exhibits very elegant undulations of the fibre, representing bunches of feathers or sheaves of corn. These pieces, divided into thin veneers, were formerly much used by cabinet-makers in the United States to embellish their work.

The Canoe Birch affords tolerably good fuel, but is inferior to Maple. On trees not exceeding eight inches in diameter the bark is of a brilliant white, like that of the White Birch of Sweden, and like that too it is almost indestructible. Trees long since prostrated by time are often met with in the forests, whose trunk appears sound, while the bark, which remains perfect, contains only a friable substance like vegetable mould. This bark, like that of the European species, is devoted to many uses. In New Brunswick large pieces are placed beneath the shingles and clapboards to render the houses dryer and less penetrable to cold.

The Indians make boxes, dishes, and a variety of ornamental articles of Birch bark; the boxes they ornament very neatly with stained porcupine quills; the ornamental articles for ladies are embroidered with coloured silks, or dyed moose hair. Their wigwams are always built of it, and they use it for water vessels, drinking cups, and an almost endless variety of purposes. They sometimes manage to boil water in this bark when split very thin, and in that state they frequently use it as paper.

But the most important use of this bark, and for which no other can be used, is in the construction of canoes. To procure a proper piece for making a canoe, the largest, straightest, and smoothest trunks are selected, and generally cut down. The writer once assisted a Milicete Indian in procuring a very fine "bark," and it was thus managed. After the tree was cut down a circular incision was made as far up the trunk as the bark was good, that is just below the branches. A very careful examination was then made to ascertain the best side of the bark, in order that the most perfect portion might form the bottom of the canoe; this being ascertained, a straight incision was made from the circular incision to the butt of the tree. The edges of the bark were next raised with wedges, and much precaution was used to prevent any portion flying off too suddenly and spoiling the whole. When the edges of the bark were fully cleared from the trunk of the tree, the bark was relieved from the pressure, which was kept on it until then, and the whole bark of the trunk flew off at once. The piece thus obtained was twenty-two feet in length, fifty-six inches in width at one end, and forty-six inches at the other. It was subsequently formed into a large canoe of the Milicete fashion. These canoes are stitched together with fibrous roots of the White Spruce, about the size of a quill, which are deprived of the bark, split, and suppled in water. The gunwales and ribs are formed of White Cedar (*Cupressus Thyoides*), and the cross-bars of Sugar Maple; the seams are coated with spruce gum. The paddles are made either of the Red-flowering Maple or the Sugar Maple, but the latter is preferred.

2. White Birch—*Betula Populifolia.*

Description.—The White Birch is most frequently found in places scantily furnished with trees, where the soil is dry and meagre; in these situations

it commonly rises to the height of twenty or twenty-five feet, and is generally associated with the Aspen or Poplar. Single trees which grow accidentally in moist and sheltered places expand to an ampler size, and are sometimes forty feet in height, yet not more than nine inches in diameter. It is less abundant than the other species of the Birch tribe, and is rarely found in groups. It is commonly seen by the side of highways growing singly, on burnt land or sandy soils which have been exhausted by cultivation, or which are too poor to produce crops.

On trees that are fully grown the branches are numerous, slender, and generally drooping. The leaves are smooth on both surfaces, heart-shaped at the base, very sharp at the point, and doubly and irregularly toothed. The foot-stalks are slightly twisted, and the leaves are thus rendered somewhat tremulous like those of the Aspen (*Populus Tremuloïdes*), and hence it has obtained the specific name *Populifolia,* or Poplar-leaved Birch.

The trunk of this species is clad in a bark as white or whiter than that of the Canoe Birch; but its outer bark, when separated from the inner bark, is incapable of being divided like that of the Canoe Birch into thin sheets, which constitutes a very essential and most important difference.

Properties and Uses.—The wood of the White Birch is very soft, brilliant when polished, and perfectly white. From its speedy decay and the inferior size of the tree, it is not employed for any use except for fuel, and then but seldom where other wood can be procured, as it is of very little value even for that purpose. The twigs are too brittle for common brooms.

3. Yellow Birch—*Betula Lutea.*

Description.—This species of Birch abounds in New Brunswick; it is always found on cool and rich soils with Ash, Hemlock Spruce, and Black Spruce. In these situations it attains its largest size, which is from sixty to seventy feet in height, and more than two feet in diameter.

The specific name *Excelsa,* which has been given to the Yellow Birch, is injudicious, as it leads to an erroneous opinion that it surpasses all others of its species in height. It is a beautiful tree; its trunk is nearly uniform in diameter, straight and destitute of branches for thirty or forty feet.

It is particularly remarkable for the colour and arrangement of its outer bark, which is of a brilliant golden yellow, and which frequently divides itself into very fine strips, rolled backwards at the ends, and attached in the middle.

The young shoots and the leaves at their unfolding are downy. Towards the middle of summer, when fully expanded, the leaves are perfectly smooth, except the foot-stalk, which remains covered with a fine short hair; the leaves about three and a-half inches long, two and a-half inches broad, oval acuminate, and bordered with sharp and irregular teeth. The leaves, the bark, and the young shoots have an agreeable taste, and similar to those of the Black Birch, though less sensible, which they lose in drying.

Properties and Uses.—The wood of the Yellow Birch is inferior in quality and appearance to that of the Black Birch; it never assumes as deep a shade, but it is strong, and when well polished, makes handsome furniture.

This Birch is found by experience to be every way proper for that part of the frame of vessels which always remains under water. It furnishes an

excellent combustible. The young saplings are employed in New Brunswick almost exclusively for the hoops of casks. Brooms are made of the twigs, and the Indian women make brooms of the wood by splitting it up.

The bark of the Yellow Birch, though valuable for tanning, is but seldom used for that purpose in New Brunswick. It is sometimes employed in small proportion in the State of Maine, but only for what the curriers call "fair leather."

Russian leather is prepared with empyreumatic oil from the bark of this tree, whence its peculiar odour.

Yellow Birch timber is exported from this province to Europe in considerable quantities, but it is shipped with Black Birch, and passes with that species indiscriminately, under the general name of Birch.

4. Black Birch—*Betula Lenta.*

Description.—The late Dr. Cochran, of Windsor, designated this species of Birch as *Betula Nigra;* Michaux, senior, describes it under the name of *B. Nigra;* and Michaux, junior, as *B. Lenta.* The latter is retained as the most significant, and as most accurately indicating the peculiar appearance of the trees of this species.

The agreeable foliage of the Black Birch, and the valuable properties of its wood, render it the most interesting of the American Birches. In Canada it is called Cherry Birch; in New Brunswick it is always called Black Birch.

It grows in preference in deep, loose, and cool soils; in these situations it obtains its greatest expansion, sometimes exceeding seventy feet in height and three feet in diameter. Its vegetation is beautiful, and in a congenial soil its growth is rapid. It is stated in the "Annals of the Arts" that a tree of this species attained the height of forty-five feet in nineteen years.

The Black Birch is one of the earliest trees to renew its foliage. The leaves, during a fortnight after their birth, are covered with a thick, silvery down, which disappears soon after. They are about two inches long, toothed, heart-shaped at the base, pointed at the summit, of a pleasing tint, and fine texture like the leaves of the Cherry tree. The young shoots are brown, smooth, and dotted with white, as are also the leaves. When bruised, the leaves diffuse a very sweet odour, and as they retain the property when dried and carefully preserved, they afford an agreeable infusion, with the addition of milk and sugar.

The bark upon the trunk of trees less than eight inches in diameter is smooth, grayish, and perfectly similar in colour and organization to that of the Cherry tree. On old trees the outer bark is rough and of a dusky gray colour; it detaches itself transversely at intervals in hard, ligneous plates, six or eight inches broad.

Michaux, the younger, calls this Birch one of his favourite trees, and recommends it to the lovers of foreign vegetables as eminently adapted by the beauty of its foliage and the agreeable colour of its leaves, to figure in the parks and gardens of Europe. He strongly recommends the inhabitants of the Old World to introduce it into their forests, and particularly mentions the north of France, England, and Germany as favourable to its growth, from the greater humidity of the climate.

Properties and Uses.—The wood of the Black Birch, when freshly cut, is

[illegible] deepens by exposure to the light. Its grain is fine and close, whence it [illegible] tible of a brilliant polish; it possesses also a considerable share [illegible] The union of these properties render it superior to all other species of birch, whether European or American.

The weight of a cubic foot of the wood of the Black Birch, when seasoned, is forty-five pounds.* When well seasoned, (which can only be done thoroughly under water,) it makes very strong and useful articles of furniture, for which it would be more generally used but for its constant tendency to warp. It is much used in New Brunswick in ship-building for the keel and lower timbers of vessels; and as it is almost imperishable under water, it is well adapted for planking, piles, foundation timber, sluices, and, in general, for any purpose where it is constantly wet.

Black Birch wood is now exported in large quantities to the United Kingdom, in the form of squared timber and sawn planks; the quantity of each is annually on the increase. It has been suggested by a gentleman well acquainted with the timber trade, that sawed birch staves might be made a profitable article of export to Great Britain, for making herring barrels on the British coasts.

The wood of this species of Birch furnishes excellent fuel, second only to that of the Sugar Maple. The inner bark is full of tannin, but its useful properties in this respect have been hitherto neglected in New Brunswick. The sap, drained by incision in March and April, makes excellent vinegar, and a pleasant weak wine may be obtained from it by boiling and fermentation.

ALDER.

The Alder is found everywhere in New Brunswick, frequently growing along the sides of brooks, and abounding still more in places covered with stagnant water. As the roots of the Alder penetrate to a great distance, it contributes more effectually than most other trees to support the banks at the season of the overflowing of the waters.

Two species only will be noticed; a third, known as *Alnus Crispa*, or curled-leaved Alder, is too small to be remarked. It is said to abound in Newfoundland and in Labrador, and must, therefore, be exceedingly hardy.

1. Common Alder—*Alnus Serrulata.*

2. Black Alder—*Alnus Glauca.*

Description.—The ordinary dimensions of the common Alder is about ten or twelve feet in height, and two or three inches in diameter. Its leaves are of a beautiful green, distinctly furrowed on the surface, and doubly notched at the edge.

The Black Alder is much larger than the common Alder, being sometimes eighteen or twenty feet in height, and three or four inches in diameter. Its leaves are similar in shape, but are easily distinguishable by their different tint and superior size; they are of a pale bluish green, and a third

* The specific gravity of water being estimated at 1000, that of seasoned Black Birch wood is 720. When green, this wood floats with difficulty, and sinks after a time, unless supported by timber of less specific gravity.

larger than those of the common Alder. The bark of the trunk, and of the secondary branches, is smooth, glossy, and of a deep brown colour, sprinkled with white. Both species grow in cool, moist places, on the banks of rivulets, and in swamps. As their trunks are generally straight, tapering gradually from base to summit, garnished with numerous branches, bending rather close around the stock, they grow in great numbers in a small space.

Properties and Uses.—The wood of the Alder, when first laid open, is white, but it soon becomes reddish by contact with the air. The small size of both species mentioned, prevent their being of any very great use in the arts.

The Alder takes a better black than any other wood; when polished and varnished it affords a good imitation of Ebony. With sulphate of iron, the bark forms a black dye for colouring wool; it is sometimes used by hatters in the United States for dyeing hats.

A cubic foot of Alder wood, in a dry state, weighs from thirty-four to fifty pounds. It soon rots when exposed to the weather, or to damp; but it is extremely durable in water, or in wet ground.

CHERRY.

The trees of this genus are deciduous, with smooth serrated leaves, and white flowers. There is much confusion among botanists as regards all the species which are natives of North America.

The two species which have been noticed in New Brunswick are more or less abundant, in proportion to the dryness and humidity of the soil, which are alike unpropitious. They stand less in need of shelter than any fruit-bearing tree whatever, and may often be employed on the margins of orchards, or for surrounding kitchen gardens to form a screen against high winds. They are said to thrive best when unmixed with other trees; and they suffer grass to grow beneath their shade.

According to experiments which have been made, it is stated that no tree of considerable size bears transplanting better than the wild Cherry. As in the case of all large trees which have been removed, they suffer a check by the operation; but from this they generally recover in the course of two, or at most, three seasons.

As a tree, one of its valuable properties is the food and protection which it affords to numerous species of birds. This is one reason why the cultivation of the wild Cherry is so generally encouraged in the forests of Britain, of Belgium, and of France; as it not only increases the number of birds by supplying them with nourishment, but is the means of destroying countless insects, which these important and useful creatures devour. In all ornamental plantations, hedge-rows, and avenues, wild Cherry trees are desirable objects of culture on this account, as also for their hardihood, and the great beauty of their flowers and fruit, which are produced in the greatest profusion in their respective seasons of the year.

In France, the wild Cherry tree is highly prized for the food it supplies to the poor; and a law was passed, as long ago as 1669, commanding the preservation of all Cherry trees in the Royal forests, in consequence of which they became so numerous, that there was no longer room for the

underwood to grow; when, as usual, going to the other extreme, most of them were cut down. This measure, it was remarked, was a great calamity to the poor, who, during several months of the year, lived, either directly or indirectly, on the produce of the *merisier*, or wild Cherry tree. Soup made of the dried fruit, with a little bread and butter, was the common nourishment of the woodcutters and charcoal-burners of the forest during the winter. This fruit is much used in Europe at present, to make jelly or *rob*, and in the manufacture of *liqueurs*, such as cherry brandy, and ratafia. *Kirschenwasser*, an ardent spirit much used in Germany and Switzerland, is also made of it; and the famous liqueur *Maraschino*, is the product of a small acid cherry that abounds in the north of Italy, at Trieste, and in Dalmatia.

1. Wild Cherry Tree—*Cerasus Virginiana.*

Description.—In New Brunswick, this tree seldom exceeds thirty or forty feet in height, with a trunk eight or ten inches in diameter. Its bark is so peculiar as to render it distinguishable at first sight, when the form of the leaves cannot be discerned; it is blackish and rough, and detaches itself in narrow, semi-circular, hard, thick plates, which adhere for a time to the tree before dropping off; these are renewed after a considerable period.

The trunk is usually straight for about one-fourth of its height, where it ramifies into a spreading summit of a handsome outline; but its foliage is too thin to display that massive richness which gives so much beauty to the Maples, and many other trees. The leaves are usually about four inches long, toothed, very much pointed, and of a beautiful, smooth, shining green, with two or more small reddish glands at the base. The flowers are white, and occur in spikes, which, when fully expanded, have a fine effect. They put forth in New Brunswick in May and June; in 1846 they were observed in full blow on the 24th May; the season being more early than usual. The fruit is about one-fourth of an inch in diameter, of a roundish form, purplish black colour, and edible, but slightly bitter to the taste. It arrives at maturity in August or September, when it affords great nourishment to several species of birds.

There is a variety of the wild Cherry tree known in New Brunswick as the "Choke Cherry," which has been designated *Cerasus Virginiana præcox*. This variety differs from the species in having broadly-oval leaves, abruptly pointed, being sometimes sub-cordate at the base, very sharply, and often doubly toothed, and generally hairy in the axils of the veins beneath. The petals are orbicular; the fruit sub-globose, of a glossy scarlet, red when ripe, sweet and pleasant, but so very astringent that it dries the mouth and throat like the juice of spruce cones when swallowed. It usually ripens its fruit several weeks earlier than the species of which it is a variety, and hence the name *præcox*.

The wild Cherry tree has been observed in greatest abundance at Sussex Vale, and on the alluvial banks and islands of the river Saint John.

Properties and Uses.—The wood of the wild Cherry tree is of a dull, light red tint, which deepens with age. It is compact, fine-grained, takes a brilliant polish, and when perfectly seasoned is not liable to warp. In the United States, where this tree grows to a very large size, it is extensively used by cabinet-makers for almost every species of furniture; and when chosen near the ramification of the trunk, it rivals mahogany in beauty.

The bark of the branches and of the roots is there collected by herb-venders, and brought to market in pieces or fragments. The bark of the root is regarded as the best, is destitute of epidermis or outer bark, of a reddish brown colour, brittle, easily pulverized, and presents, when broken, a grayish surface. When fresh the odour is prussic, which is lost in a measure in drying, but regained by maceration; the taste is aromatic, prussic, and bitter. It is stated, undoubtedly, to be a useful tonic, and to possess, in some degree, narcotic and anti-spasmodic properties.

The fruit is employed in New Brunswick to make a cordial, by infusion in rum or brandy, with the addition of sugar; and when carefully made with brandy, it is superior to the *Kirschenwasser* imported from Copenhagen. There is little doubt that the fruit, if skilfully treated, would produce as fine a *liqueur* as any of those made in Europe from the fruit of the wild Cherry tree, and for which such high prices are obtained.

2. Northern Cherry Tree—*Cerasus Borealis.*

Description.—The *Cerasus Borealis* is a handsome small tree, growing to a height of twenty or thirty feet, with a trunk six or eight inches in diameter, and covered with a smooth brownish bark, which detaches itself laterally. Its leaves are from three to five inches long, oval, toothed, and very sharp pointed. The flowers put forth in May or June, and occur in small white bunches, which give birth to a small, red, intensely acid fruit, which arrives at maturity in August. The fruit is not very abundant even on the largest trees.

This tree, like the Canoe Birch, is said to offer the same remarkable peculiarity of reproducing itself spontaneously in old cultivated fields, or such parts of the forest as have been burnt over. Of all the trees of North America no one is so nearly allied to the common Cherry (*Cerasus Vulgaris*) as the present species, and hence it has been recommended as a suitable stock to graft that Cherry upon.

Properties and Uses.—The wood of the Northern Cherry tree is exceedingly hard, fine-grained, and of a reddish hue, but the inferior size of the tree forbids its use in the mechanical arts.

POPLAR.

At present only two species of trees of this genus have been recognised in New Brunswick, although one other species is supposed to exist. The Poplar has not yet been much noticed in this province, scarcely so much as it deserves, although its value is not very great.

The wood of the European Aspen lasts long exposed to the weather, and most Poplars are said to be very durable in a dry state, agreeably to the English woodman's adage,—

> "Cover me well, to keep me dry,
> And *heart* of Oak I do defy."

The wood of most of the species is described as making very good flooring for bed-rooms, and places where there is not much wear, and it has the advantage of not catching fire readily; or, as Evelyn has it, "The Poplar burns untowardly, and rather moulders away than maintains any solid heat."

The wood of the Lombardy Poplar is recommended for cheese-rooms and farm-houses in general, because neither mice nor mites will attack it.

1. Balsam Poplar—*Populus Balsamifera.*

Description.—This species of Poplar is best known in New Brunswick by the name of "Balm of Gilead." It is abundant on the rich alluvial lands on the borders of the river St. John above Fredericton, and along the valley of the Tobique. The largest trees of the species were noticed by the writer on a piece of intervale at the junction of the Salmon river with the river St. John, six miles below the Grand Falls. They were there greatly multiplied, to the exclusion of almost every other description of tree; many of them reached the height of eighty feet, and were upwards of two feet in diameter. They are also found of large size in similar situations on the banks of the Miramichi and Restigouche.

In the spring, when the buds begin to develope, they are abundantly coated with a yellowish glutinous substance, of a very agreeable smell, and though this exudation diminishes at the approach of summer, the buds retain a strong balsamic odour. This odour is very much admired; and as this species of Poplar grows very rapidly, and is easily transplanted or propagated from cuttings, it is much in request as an ornamental tree. It will grow in all soils, but worst in clay; it impoverishes the land, destroys the grass, and the numerous shoots of the roots spread so near the surface of the earth that they permit nothing else to grow, but rise in all quarters whether they are wanted or not.

Properties and Uses.—Hitherto the wood of the Balsam Poplar has not been brought into very profitable use. It is extremely light, white, smooth, woolly, and soft; and there are, no doubt, many purposes for which it might be advantageously employed. Such, however, is not likely to be the case in New Brunswick, where abundance of other wood is found so greatly superior in quality.

2. American Aspen—*Populus Tremuloïdes.*

Description.—The ordinary height of the smaller species of Poplar is about thirty feet, and its diameter five or six inches. The larger variety (which has been described as a distinct species, by the designation of *P. Grandidentata,* but is believed to be only a variety of this species) grows to the height of fifty or sixty feet, and the diameter of eighteen inches or more; it flourishes as well on the border of swamps as on uplands.

The straight trunk of the Aspen is covered with a smooth greenish bark, which is rarely cracked, except on the base of the oldest trees, where it becomes furrowed. It blooms early in May, ten days or a fortnight before the birth of the leaves. In 1846 this tree was observed in full bloom on the 18th April, which was unusually early. The catkins which spring from the extremity of the branches are composed of silky plumes, and of an oval form, somewhat more than an inch in length. The leaves are about two inches broad, narrowed at the summit, and supported by long footstalks. On stocks, seven or eight feet in height, they are nearly round, and are bordered with obtuse, irregular teeth; on young shoots they are of twice the size mentioned, heart-shaped, and pointed at the summit.

Of all the Poplars of America this species has the most tremulous leaves; the gentlest air suffices to throw them into agitation.

Properties and Uses.—The wood of the smaller variety of the American Aspen is light, soft, destitute of strength, and of little utility. It is felled only to disencumber lands which are being cleared for cultivation. As the wood may be divided readily into very thin laminæ, it is sometimes used for the manufacture of ladies' and children's bonnets and light summer-hats, which are very pretty when new, but not very durable.

There is great superiority in the wood of the larger variety of this species of Poplar over that of the smaller variety. It is white, fine and strong; it gives a firmer hold to nails, and it is not liable to warp or split. The largest and best specimens of this beautiful wood as yet seen were found on the banks of the river Miramichi, where it is used for the ornamental work of ships' cabins, in conjunction with Bird-eye Maple. It has a very silky lustre, and when varnished and polished bears a very close resemblance to Satin Wood, to which it is very little, if at all inferior, for ornamental purposes.

The weight of a cubic foot of the large variety from Miramichi has been found to be twenty-six pounds.

The Acadian French inhabitants of the northern coast of New Brunswick use the wood for their *sabots*, or wooden shoes, and also for bowls, trays, and a variety of purposes in domestic economy. The superior size of this Poplar renders it easily recognised when met with in the forest by the woodman; and its timber should be preserved, not only for its beauty, but for the variety of useful and ornamental purposes to which it may be applied.

The bark of the Aspen is the principal food of beavers, who cut down the smaller trees, as well to procure food, as to build with them their singularly ingenious dams for creating artificial ponds.

BEECH.

In North America, as in Europe, the Beech is one of the most majestic trees of the forest.

Beech, says White of Selborne, is one of the most grand and lovely of all the forest trees, whether we consider its stately trunk, its smooth silvery rind, its glossy foliage, or graceful spreading pendulous branches. No tree, says another writer, is more beautiful when standing singly in parks, or ornamental grounds, as it throws out its branches very regularly, and feathers almost to the ground. In woods or groves, it grows clear of branches to a considerable height. Virgil was right in choosing the Beech for its shade, for no tree forms so complete a roof; but no verdure is found under its shade.

The Beech is most pleasing in its juvenile state. A light airy young tree, with its spiry branches hanging in easy forms, is often beautiful.

Two species of Beech are found in New Brunswick, which have been treated as varieties, but Michaux the younger says, that his own observations confirm the opinion of the inhabitants of these colonies, who have always considered them as distinct species, and given them the names o. "White Beech" and "Red Beech," from the colour of their wood;—he adds, that trees of the same genus are more frequently distinguished in America by the complexion of their wood, than by the difference of their foliage and flowers.

1. White Beech—*Fagus Sylvestris.*

Description.—A deep, moist soil, and a cool atmosphere, are necessary to the utmost expansion of the White Beech. Where the Beeches vegetate, in a deep and fertile soil, their roots sometimes extend to a great distance even with the surface, and being entangled so as to cover the ground, they embarrass the steps of the traveller, and render the land difficult to clear.

The White Beech is more slender and less branchy than the Red Beech; but its foliage is superb, and its general appearance magnificent. The leaves are oval-pointed, smooth, shining, and bordered in the spring with soft, hairy down. The sexes are borne by different branches on the same tree; the barren flowers are collected in pendulous, globular heads, and the others are small and of a greenish hue. The fruit is in an erect capsule, covered with loose, flexible spines, which divides itself at maturity into four parts, and gives liberty to two triangular seeds. The bark upon the trunk of the Beeches is thick, gray, and on the oldest stocks, smooth and entire.

The perfect wood of this species bears a small proportion to the sap-wood, and frequently occupies only three inches, in a trunk eighteen inches in diameter. The specific name of "White Beech" is derived from the colour of its alburnum or sap-wood.

Properties and Uses.—The wood of this species is of very little value except for fuel.

In Ohio, the bark of the White Beech is used for tanning, and the leather made with it is said to be white and serviceable, and inferior only to that prepared with Oak bark.

2. Red Beech—*Fagus Ferruginea.*

Description.—This species of Beech is almost exclusively confined to the north-eastern parts of the United States, and the provinces of Canada, New Brunswick, Nova Scotia, and Prince Edward Island. In some parts of New Brunswick, and generally in Prince Edward Island, it is so abundant as to constitute extensive forests, the finest trees growing on fertile, level, or gently sloping lands, which are proper for the culture of grain. Its name is derived from the colour of its wood, and not from its leaves.

The Red Beech equals the White Beech in diameter, but not in height; and as it ramifies nearer the earth, and is more numerously divided, it has a more massive summit, and the appearance of more tufted foliage. Its leaves are equally brilliant with those of the White Beech, a little larger and thicker. They become a pale yellow in the Autumn, and they frequently remain on the tree during the Winter, retaining that colour. The fruit is of the same form as that of the White Beech, but is only half as large, and is garnished with firmer and less numerous points. To these differences must be added an important one in the wood. A Red Beech, fifteen or eighteen inches in diameter, has not more than three or four inches of sap; while a White Beech of the same size, has thirteen or fourteen inches of sap-wood, and very little heart of any value.

Properties and Uses.—The wood of the Red Beech is stronger, tougher, and more compact than the White, and it bears a very strict analogy to the European Beech. When perfectly seasoned it is not liable to warp; and a cubic foot of it then weighs from forty-three to fifty-three pounds.

Representing the strength of Oak by 100, that of Beech will be 103.
„ stiffness of Oak by 100, „ 77.
„ toughness of Oak by 100, „ 138.

Hence it appears that Oak is superior in stiffness, but neither so strong nor so tough.

Before iron rails were introduced, much Beech was used for railways, for the collieries about Newcastle.

The Red Beech is very durable when preserved from humidity, and incorruptible when constantly in the water; but it rapidly decays when exposed to the alternation of dryness and moisture. It is much esteemed in naval architecture for those parts of vessels which are constantly wet; and it is much used in Prince Edward Island. An old and experienced English ship-builder, residing at Richmond Bay, in Prince Edward Island, assured the writer that, on the lower part of vessels, he had known the Red Beech wood of the island sound at the end of forty years; in such situations he considered it fully equal to English Oak in strength and durability.

The wood of the Red Beech is much esteemed for fuel, and its ashes afford good potash. It serves for shoe-lasts, tool-handles, planes, and mallets; and sometimes chairs, bedsteads, and other articles of furniture, are made of it.

Experience has demonstrated the advantage of felling the Red Beech in the summer, when the sap is in full circulation; if cut at that time it is very durable, but if cut in the winter it decays in a very few years. The logs should be left several months in the shade before they are hewn, care being taken that they do not rest immediately upon the ground. After being hewed, or sawn into planks, they should lie in water for some time; in this way, the wood seasons without splitting, and is sure to be rendered inaccessible to worms, to which, in general, Beech is very subject.

Sheep and goats eat the leaves of the Beech. When gathered in autumn, before they are much injured by frost, the leaves, on account of their elastic quality, make better *paillasses* than either straw or chaff, and they last seven or eight years.

The nuts of the Red Beech are produced every second year. They are of a triangular form, with a smooth, tough skin, and a fine interior pellicle, adhering to the kernel. They are united in pairs, in capsules garnished with points, from which they escape about the first of October, the season of their maturity. In France and Germany an oil is extracted from the Beech nut, next in fineness to that of the olive, and which may be preserved longer than any other oil. But they seem to yield little oil in northern countries; Linnæus says that in Sweden, very little oil can be expressed from them, and the attempt has not yet been made in New Brunswick. Hogs fatten rapidly on Beech nuts, but the pork is not esteemed; bears, partridges, squirrels, and mice, feed on them largely.

In Belgium very solid and elegant hedges are made with young Beeches placed seven or eight inches apart, and bent in opposite directions, so as to cross each other and form a trellis, with apertures five or six inches in diameter. During the first year they are bound with osier at the points of intersection, where they finally become grafted, and grow together. As the Beech does not suffer in pruning, and sprouts less luxuriantly than most other trees, it is perfectly adapted to this object.

In New Brunswick such hedges would be of great utility, and the attempt

to form them is worthy of being made. The Beech is reared without difficulty from the seed. The nuts may be sown at any time after October, but the most eligible season is about a fortnight after they fall from the tree; the ground should first be ploughed and harrowed.

It is commonly believed that a great length of time is necessary for the growth of a good hedge. The Red Beech grows rapidly; and if the soil is in good order, a handsome and sufficient hedge may be produced in five or six years. When fully grown, hedges are indisputably the finest enclosures in the world for the country. The wall of masonry, the iron palings, or the wooden fence, may be well suited in crowded towns, or their vicinity; but for harmony of colour, freshness of foliage, and in short, all that is desirable, the verdant hedge is without an equal.

GENUS CARPINUS.

Of the genus *Carpinus* two species are found in New Brunswick, which are commonly known by the names of Hornbeam and Iron Wood. The wood of each is exceedingly hard and tough, and capable of bearing great weight; but as they are trees of the third order only, their small size prevents their being so generally useful as they would be if of larger dimensions.

1. American Hornbeam—*Carpinus Americana.*

Description.—In New Brunswick the Hornbeam is repressed by the severity of the climate, and is less multiplied and of smaller dimensions than in a more southern latitude. Its ordinary stature is from twelve to fifteen feet, but it sometimes reaches twenty-five or thirty feet in height, and six inches in diameter; but as not more than one stick in a hundred attains these dimensions, it must be considered rather as a large shrub than a tree. It prospers in almost every soil, except in places that are too long inundated, or which are absolutely sterile.

The trunk of the American Hornbeam, like that of the analogous species in Europe, is obliquely and irregularly fluted, frequently through all its length. By its form, and by the appearance of its bark, which is smooth and spotted with white, it is easily distinguished when the leaves are fallen. It sheds its leaves in autumn, about the same time with the Elm. During the time of its verdure it makes a good appearance, being well clothed with leaves, which are oval-pointed, finely denticulated, and of a deep, strong, green colour. Cattle eat the leaves, but no pasture grows under its shade; it is easily transplanted, and bears lopping. The fructification is always abundant, and the aments remain attached to the tree long after the foliage is shed.

Properties and Uses.—The wood, like that of the European Hornbeam, is white, and exceedingly compact and fine-grained. It is in great request among farmers for axe-handles, and for agricultural implements, or for such parts of them as require great strength. Cogs for mill-wheels are made of the wood, and are accounted superior to those made of the wood of the Sugar Maple, which is generally used for that purpose.

In Scandinavia, the inner bark of the Hornbeam is used to dye yellow: and the Indians of America use it occasionally for a similar purpose.

2. Iron Wood—*Carpinus Ostrya.*

Description.—Though the Iron Wood is multiplied in the forests of New Brunswick, it nowhere forms masses even of inconsiderable extent, but is loosely disseminated, and found only in cool, fertile, and shaded situations. It rarely reaches thirty-five feet in height, and twelve inches in diameter; and commonly does not exceed half these dimensions.

In the winter, this tree is recognised by a smooth grayish bark, finely divided, and detached in strips not more than a line in breadth. The leaves are alternate, oval-acuminate, and finely and unequally denticulated. The fertile and barren flowers are borne at the extremity of different branches of the same tree, and the fruit is in clusters like hops, whence the specific name *Ostrya.* The small, hard, triangular seed, is contained in a species of reddish, oval, inflated bladder, covered at maturity with a fine down, which causes a violent irritation of the skin if carelessly handled.

The concentrical circles of the wood are closely compressed, and their number, in a trunk of only four or five inches in diameter, evinces the length of time necessary to acquire this inconsiderable size. The Canadian French call Iron Wood, *bois dur*, hard wood.

Properties and Uses.—The wood of this tree is perfectly white, compact, fine-grained and heavy. To its inferior dimensions must be ascribed the limited use of a tree, the superior properties of whose wood are attested by its name. It is exceedingly valuable for all purposes to which its small size will permit it to be applied.

Near New York, brooms and scrubbing-brushes are made of Iron Wood, by shredding the end of a stick of suitable dimensions.

ASH.

The Ash is a very rapid growing tree, and its wood varies more from difference of soil and situation, than that of any other tree. Although only two distinct species have been recognised as existing in New Brunswick, yet there are several varieties of each, in different parts of the province, each bearing a local name. These varieties, on close examination, will be found referrible to one of the two species hereafter described, White Ash and Black Ash.

The wood of Ash soon rots when exposed either to damp or alternate dryness and moisture, but is tolerably durable in a dry situation. It is said that the best season for felling Ash is from November to February; and that when felled in full sap, it is very subject to the worm. In such case, the wood is said to be much benefited by water seasoning. It is very much esteemed for its toughness and elasticity; and in consequence of these properties, it is useful whenever sudden shocks are to be sustained, as in various parts of machines, wheel-carriages, implements of husbandry, ship-blocks, tools, and the like. It has been found as useful in the arts of war as in those of peace, in ancient as well as in modern times:

> "From Pelion's cloudy top, an ash entire
> Old Chiron fell'd, and shap'd it for his sire."—*Pope's Homer.*

The wood is too flexible for the timber of buildings, and not sufficiently durable. Its texture is alternately compact and porous, the compact side

of the annual ring being the lighter coloured, which renders the annual rings very distinct.

The drip of the Ash is said to be very unfavourable to all other vegetable productions. It exhausts the soil very much; the roots spread widely near the surface.

1. White Ash—*Fraxinus Americana.*

Description.—The White Ash is an interesting tree from the qualities of its wood, the rapidity of its growth, and the beauty of its foliage. It abounds in New Brunswick; a cold climate seems most congenial to its nature.

The bark is of a white colour; on large stocks the bark is deeply furrowed, and divided into small squares, one to three inches in diameter.

The most favourable situations for White Ash are the banks of rivers, and the edges and surrounding acclivities of swamps, where the soil is deep and fertile. In such situations it sometimes attains the height of fifty or sixty feet, with a diameter of eighteen inches or more. The trunk is perfectly straight, and often undivided to the height of more than thirty feet.

The leaves of the White Ash are opposite, and composed of three or four pairs of leaflets, surmounted by an odd one. The leaflets, which are borne by short footstalks, are three or four inches long, about two inches broad, oval-pointed, rarely denticulated, of a delicate texture, and an undulated surface. Early in the spring they are covered with a light down of a pale green colour above and whitish beneath. As the contrast of colour between the surfaces is remarkable, and is peculiar to the species, Dr. Muhlenberg has denominated it *Fraxinus Discolor.*

The shoots of the two preceding years are of a bluish grey colour, and perfectly smooth; the distance between their buds sufficiently proves the vigour of their growth.

White Ash is almost always accompanied by White Elm, Yellow Birch, White Maple, and Hemlock and Black Spruce.

Properties and Uses.—The wood of the White Ash in young thrifty trees is very white, from the bark to the centre; but, in large old trees, the heart-wood is of a reddish tinge, and the sap-wood white. The weight of a cubic foot of this wood, when dry, varies from thirty-four to fifty-two pounds; when the weight of a cubic foot is lower than forty-five pounds the wood is that of an old tree, and will be found deficient both in strength and toughness.

Representing the strength of Oak by	100,	that of Ash is	119.
„ stiffness of Oak by	100,	„	89.
„ toughness of Oak by	100,	„	160.

The Ash therefore exceeds Oak both in strength and toughness, and in young wood the difference is still more considerable.

The wood of the White Ash is highly esteemed in New Brunswick for its strength, suppleness, and elasticity. It is superior to every other wood for oars, and second only to Hickory for handspikes. Besides its use by carriage and sleigh-makers, it is in very general use for agricultural implements and domestic wares, especially for the handles of spades, hoes, shovels, forks, rakes, and scythes. Ash staves are among the exports from

New Brunswick, and the wood of the White Ash is acknowledged to be in many respects superior to the European Ash (*Fraxinus Excelsior*).

In Europe, Ash bark is used to tan calf skins, and the experiment would be worth making in this province with the bark of the White Ash. Cattle eat the leaves of Ash greedily, but they are said to give a bad flavour to the butter.

2. Black Ash—*Fraxinus Sambucifolia.*

Description.—This Ash is generally known in New Brunswick by the name of "Swamp Ash;" in the United States it is called "Water Ash." It requires a moist soil, exposed to longer inundations than the White Ash, and is usually accompanied by the red-flowering Maple, Yellow Birch, Black Spruce, and White Cedar. It does not often exceed forty feet in height, or twelve inches in diameter.

The buds of the Black Ash are of a deep blue, and the young shoots of a bright green, sprinkled with dots of the same colour, which disappear as the season advances. The leaflets are of a deep green colour, smooth on the upper surface, and coated with red down upon the main ribs beneath; when bruised they emit an odour like that of Elder leaves.

The Black Ash is easily distinguished from the White Ash by its bark, which is of a duller hue, less deeply furrowed, and has the layers of the epidermis applied in broad sheets. It is among the last trees which put forth in spring, and the earliest that lose their leaves in autumn. The very first frost that comes, not only causes its leaves to fade and become yellow like those of other trees, but blackens and shrivels them up, so that they fall in showers, with the least breath of wind.

Properties and Uses.—The perfect wood of the Black Ash is of a brown complexion and fine texture; it is more elastic than that of the White Ash, but is neither so strong nor so durable. It is a wood therefore not greatly in request. As it may be separated into thin narrow strips it is much used by the Indians for the manufacture of baskets. In the country these strips are also used for chair-bottoms.

The Black Ash is liable to be disfigured with knobs, which are sometimes of considerable size, and are detached from the body of the tree to make bowls and ornamental articles of turnery. The wood of these excrescences has the advantage of superior solidity, and when carefully polished, exhibits singular undulations of the fibre. Dishes made of these knobs may be seen in most of the Indian wigwams (especially in remote situations), which have been used for a great number of years, and are highly prized.

The ashes of the wood of the Black Ash are said to be rich in alkali.

WILLOW.

Many species of Willow are found in the colonies, the greater part of which are susceptible of no useful employment. The three species here mentioned are distinguished only by their superior height, but they are all greatly inferior to European Willow, in the size and properties of their wood:—

1. Black Willow—*Salix Nigra.*
2. Champlain Willow—*Salix Ligustrina.*
3. Shining Willow—*Salix Lucida.*

Description.—The first of these three species (*Salix Nigra*) is the most common of the American Willows, and the most analogous to that of Europe. It rarely attains a greater height than thirty or thirty-five feet, and a diameter of twelve or fifteen inches. It divides at a small height into several divergent, but not pendent limbs, and forms a spacious summit. The leaves are long, narrow, finely denticulated, of a light green, and destitute of stipulæ. In the uniformity of its colouring the foliage differs from that of the European Willow, the lower surface of which is whitish. Upon the trunk the bark is grayish and finely chapped. Upon the roots it is of a dark brown, whence may have been derived the specific name of the tree.

The Champlain Willow (*Salix Ligustrina*) is about twenty-five feet high, and seven or eight inches in diameter. Its first aspect resembles that of the Black Willow, but its leaves are longer, and accompanied at the base by stipulæ.

The Shining Willow (*Salix Lucida*) is best known in New Brunswick by the name of "Red Willow," from the brilliant red colour of the bark on the young shoots. It is found in moist but open grounds, and is more common on the edges of meadows and on the banks of streams than in the interior of the forests. The Shining Willow attains the height of eighteen or twenty feet, but its ordinary elevation is nine or ten feet.

Properties and Uses.—The wood of the Black Willow, and of the Champlain Willow, is white and soft, and the branches of each species are easily broken from the tree. Neither the wood nor the twigs are applied to any useful purpose.

The long slender branches of the Shining or Red Willow are sometimes used for baskets, for which, however, they are rather brittle, and are therefore of little value. The Milicete Indians scrape the bark from the young twigs, and when dry mix it with their tobacco for smoking; they are very partial to the admixture, the odour of which is much more agreeable than that of pure tobacco.

The roots of the Black Willow afford an intensely bitter decoction, which is considered in the country as a purifier of the blood, and as a preventive and a remedy for intermittent fever.

ELM.

There are two well-defined species of Elm in New Brunswick, known as the White Elm and Red Elm. A third species is supposed to exist, but it is not yet fully determined whether it is merely a variety of the White Elm, or a distinct species. Every variety of Elm is beautiful, and well adapted to make shady walks, as it does not destroy the grass; and its leaves are acceptable to cows, horses, goats, sheep, and swine. Silk-worms are said to devour the tender leaves of Elm with great avidity. Many insects feed upon the leaves, particularly the *Cicadæ Ulmi* and *Aphis Ulmi*; the latter generally curl the leaves, so as to make them a secure shelter against the weather.

The bark of Elm, dried and ground to powder, has been mixed with meal in Norway, to make bread in times of scarcity. The flowers have a violet smell.

1. White Elm—*Ulmus Americana.*

The White Elm is found over an extensive tract of the North American continent, but it appears to be the most multiplied, and to attain the loftiest height, between the 42nd and 47th degrees of north latitude. It delights in low, humid, substantial soils, such as are called in New Brunswick, "intervale lands," along the banks of rivers or streams, or on the borders of swamps, where the soil is deep and fertile. It will grow, however, on any soil that is not too dry and barren, and in any situation within its natural limits, how much soever exposed.

In New Brunswick the White Elm stretches to a great height. In clearing the primitive forests, a few stocks are sometimes left standing; and, insulated in this manner, the tree appears in all its majesty, towering to the height of eighty or one hundred feet, with a trunk three or even four feet in diameter, regularly shaped, naked, and insensibly diminishing to the height of sixty or seventy feet, where it divides itself into two or three primary limbs. These limbs, not widely divergent near the base, approach and cross each other eight or ten feet higher, and diffuse on all sides, long, flexible, pendulous branches, bending into regular arches, and floating lightly in the air, giving to the tree a broad and somewhat flat-topped summit, of regular proportions and admirable beauty. When growing thus insulated, this tree is often marked by two or more small branches, four or five feet in length, proceeding from near the first ramification, and descending along the trunk; and the larger branches or limbs, as also the trunk, are sometimes covered with little ragged twigs, as if clothed with tufts of hair. The bark of the White Elm is light-coloured, tender, and very deeply furrowed. The leaves are four or five inches long, borne by short footstalks, alternate, unequal at the base, oval-pointed, and doubly denticulated. They are generally smaller than those of the Red Elm, of a thinner texture, and a smoother surface, with more regular and prominent ribs. This species differs also essentially from the Red Elm and European Elm in its flowers and seeds. The flowers appear before the leaves, and are very small, of a purple colour, supported by short, slender footstalks, and united in bunches, at the extremity of the branches. In 1846 the White Elm was noticed in flower at Hampton Ferry, so early as the 20th April; there was then no appearance of leaves.

In autumn, the bright golden foliage of the Elm kindly mixes with the various hues of the Poplar and the Maples, which display all shades of red, and from the deepest crimson to the brightest orange. Its tint then contrasts agreeably with the pale-yellow, sober foliage of the Birch and the Beech, with the different shades of brown on the Bass Wood and the Ash, or with the buff yellow of the Larch. At that season, even the gloomy blackness of the resiniferous trees, by throwing forward the gayer tints, is not without its effect.

Properties and Uses.—The quality of the wood of the Elm depends in a singular degree on the situation in which it grows. The rich "intervales" already mentioned, are necessary to its perfection; but when grown in open situations, where it is vexed by the winds, and exposed to all the influences

of the seasons, it is still firmer and more solid. The wood has less strength than the oak, and less elasticity than the Ash, but it is tougher, and less liable to split. It is said to bear the driving of bolts and nails better than any other timber. The wood is of a light brown colour, and is liable to decay when exposed to the alternations of dryness and moisture. It must be either wet or dry, in extreme; accordingly it is proper for water-works, mills, pumps, aqueducts, and ship planks beneath the water-line. It makes excellent piles, and planking for wet foundations. The piles on which London Bridge stands are chiefly of Elm, and have remained six centuries without material decay; and several other instances of its durability in water have been noticed.

When perfectly dry, the wood of the White Elm weighs only thirty-three pounds the cubic foot. If cut transversely, or obliquely to the longitudinal fibres, it exhibits numerous and fine undulations, which are very beautiful when polished. The wood is an excellent combustible, and its ashes yield a large proportion of alkali.

The bark of the White Elm is said to be easily detached during eight months of the year; soaked in water, and suppled by pounding, it is sometimes used for making ropes, and for the bottoms of chairs.

In France the wood of Elm is usually employed for mounting artillery, and for this purpose it is selected with the greatest care. The trees are cut to the proper dimensions, and the pieces are stored under shelter to dry, during six or seven years; the precaution is even observed of turning them every six months, that the seasoning may proceed more uniformly. When fully seasoned, the wood is highly esteemed for the carriages of cannon, and for the gunwales and blocks of ships.

2. Red Elm—*Ulmus Rubra.*

Description.—This species of Elm bears the names of Red Elm, Slippery Elm, and Moose Elm, but the first is most common. The Canadian French call it *Orme Gras.*

The Red Elm is less multiplied than the White, and the two species are rarely found together, as the Red Elm requires a substantial soil free from moisture, and even delights in elevated and open situations, such as the steep banks of rivers. This tree is fifty or sixty feet high, and fifteen or twenty inches in diameter. In the winter it is distinguished from the White Elm by its buds, which are larger and rounder, and which a fortnight before their development, are covered with a russet down. The flowers are aggregated at the extremity of the young shoots. The scales which surround the bunches of flowers are downy like the buds. The leaves are oval-pointed, doubly denticulated, and larger, thicker, and rougher than those of the White Elm. The bark upon the trunk is of a brown colour.

Properties and Uses.—The heart-wood of the Red Elm is less compact than that of the White Elm, coarse-grained, and of a dull red tinge. It has been remarked, that the wood, even in branches of one or two inches in diameter, consists principally of perfect wood. It is said to be stronger, more durable when exposed to the weather, and of a better quality than the wood of the White Elm, although coarser in the grain. In the United States it is accounted the best wood for blocks, and its scarcity is the only cause of its limited consumption

AMERICAN LIME, OR BASS WOOD—*Tilia.*

Although several species of the Lime tree are found in North America, yet but one species flourishes in New Brunswick, which is usually called Bass Wood. It is generally found associated with Sugar Maple and White Elm.

BASS WOOD—*Tilia Americana.*

Description.—The presence of the Lime tree indicates a loose, deep, and fertile soil. It is sometimes more than eighty feet high, and four feet in diameter; and its straight uniform trunk, crowned with an ample and tufted summit, forms a beautiful tree. The leaves are alternate, large, nearly round, finely denticulated, heart-shaped at the base, and abruptly terminated in a point at the summit. The trunk is covered with a very thick bark; the inner bark separated from the outer, and macerated in water, is formed into ropes, and also the broad plaited bands used by the Indians for carrying their burthens. They formerly made their fishing-lines and nets of this bark. The name Bass Wood is supposed to be a corruption from *Bast*, which is applied to the European Lime tree by the rustics of Lincolnshire, because ropes were made from the bark.

The twigs and buds of the Bass Wood tree are very glutinous when chewed, and afford considerable nutriment. In severe winters, when fodder is scarce, the farmers in Maine and Vermont, and sometimes in New Brunswick, drive their cattle into the woods of a morning, and fell a Bass Wood or other tree, on which they eagerly browse during the day. In winter this tree is easily recognised by the robust appearance of the trunk and branches, and by the dark brown of the colour on the shoots.

In newly cleared lands the stumps of the Bass Wood are distinguished by the numerous sprouts which cover them, whose growth can only be prevented by stripping off the bark, or by fire. The stumps of other large trees, the Elm, Sugar Maple, and Ash, left at the same height of three feet, do not produce shoots.

Properties and Uses.—The wood of the American Lime tree, when dry, weighs thirty-five pounds to a cubic foot. It is very white when green, but becomes of a light brown hue when seasoned. It is soft, easily worked, and is used for the panels of carriage-bodies, seats of chairs, and the fans of fanning mills. The wood is useless as fuel, being too full of sap when green, and of but little value when dry.

PINE.—Genus *Pinus.*

All the trees of the genus *Pinus* are evergreens, and are generally of elevated stature. They form a most interesting class, and are highly valuable for the excellent qualities of their wood, which is used for an endless variety of purposes.

The most striking difference between the Pine and the Spruce is in the arrangement of their foliage. The leaves of the Pine, which resemble pieces of coarse thread, vary in length in different species, and are united to the number of two, three, or five on the same sheath; those of the Spruces, on the contrary, are only a few lines long, and are attached singly round the circumference of the branch, or upon its opposite sides.

To facilitate the distinction of the several members of the Pine family,

the Pines have been grouped according to the number of leaves united on the same sheath, and the Spruces according to the disposition of their foliage. The Larch, although belonging to the genus *Pinus*, is treated separately, its leaves being deciduous. It may be observed that the three-leaved Pines (the Pitch Pine and other southern Pines) are not found in New Brunswick.

METHODICAL DISPOSITION OF THE PINES AND SPRUCES OF NEW BRUNSWICK.

Monœcia Monadelphia . . . Linnæus.
Coniferæ . . . . . Jussieu.

TWO-LEAVED PINES.

Cones smooth.

1. Red (Norway) Pine . . . . . *Pinus Rubra.*
2. Gray Pine . . . . . *Pinus Rupestris.*

FIVE-LEAVED PINE.

1. White Pine . . . . . *Pinus Strobus.*

SPRUCES.

Leaves short, and disposed singly round the branches.

1. Black (or Double) Spruce . . . . . *Abies Nigra.*
2. White (or Single) Spruce . . . . . *Abies Alba.*

Leaves lateral.

1. Hemlock Spruce . . . . . *Abies Canadensis.*
2. American Silver Fir . . . . . *Abies Balsamifera.*

1. Red (or Norway) Pine.—*Pinus Rubra.*

"*Leaves in pairs, elongated. Cones ovate conic, rounded at the base, about half as long as the leaves; scales dilated in the middle, unarmed.*"

Description.—The Canadian French call this tree *Pin Rouge*, Red Pine, and the name has been adopted by British colonists. It is sometimes called Norway Pine, though differing totally from that tree, which is a species of spruce.

In 1792 Michaux the elder made a journey to Hudson's Bay, for the purpose of remarking, as he returned, the points at which the vegetables of this northern region appear and disappear. He first observed the Red Pine near Lake St. John, in Canada, in the 48th degree of north latitude. Dalhousie, in this province, is a little north of the 48th degree. The Red Pine has not been seen farther south than latitude 41° 30′, and it is very rare south of the Hudson. Mackenzie, in the narrative of his journey to the Pacific Ocean, mentions it as existing beyond Lake Superior. But the Red Pine does not, like the Black Spruce, the Hemlock Spruce, and the White Pine, constitute a large proportion of the extensive forests which cover these regions, but occupies tracts of a few hundred acres, alone, or mingled only with the White Pine.

Like most species of this genus, it grows in dry and sandy soils, by which, however, the luxuriance of its vegetation is not checked, for it attains the height of seventy or eighty feet, with a diameter of two feet and upwards. It is chiefly remarkable for the uniform size of its trunk for two-thirds of its length.

The bark upon the body of this tree is of a clearer red than upon that of any other species of pine; hence is derived its popular name, and hence Michaux the younger substituted the specific name of *rubra* for that of *resinosa*, employed by Aiton, and adopted by Sir A. B. Lambert in his splendid work on the Pines of America. Another reason for the change was to prevent the mistake of supposing that this species afforded the resinous matter so extensively used in ship-building.

The leaves are of a dark green, five or six inches long, united in pairs, and collected in bunches at the extremity of the branches. The female flowers are blueish during the first months after their appearance, and the cones, which are without thorns, shed their seeds the first year.

If not sufficiently matured, or if in a situation where it grows too rapidly, it has a great deal of sap-wood, and is called "Sapling Red Pine." Extensive groves of this variety are found throughout New Brunswick, except on the river St. John, above the Grand Falls, which would appear to be too far north for its growth. The largest timber trees of this species were formerly found in abundance on the river Tobique, but they were felled and destroyed in the most reckless and wasteful manner, and but few are now to be met with there. The wanton and unprofitable waste and destruction of the large and valuable Red Pine timber of New Brunswick, which have left but a comparatively small quantity existing in the province, should teach a useful lesson with regard to the other valuable timber trees of the country, some of which are threatened with extermination from the greediness and improvidence of the lumbermen.

Properties and Uses.—The concentrical circles are crowded in the Red Pine, and the wood, when wrought, exhibits a fine compact grain. It is rendered heavy by the resinous matter with which it is impregnated. The wood is highly esteemed both for strength and durability, and is much used in ship-building. Deck planks of red pine have been often procured forty feet long, without knots. The sap-wood of red pine should always be hewn away, as the heart-wood is then much more durable.

The mainmast of the St. Lawrence, a ship of war of fifty guns, built by the French at Quebec, before the taking of that city by Wolfe, was of Red Pine, which is mentioned in proof of the large size of which this species of Pine was formerly procured.

2. Gray Pine—*Pinus Rupestris.* Michaux.

Pinus Banksiana. Sir A. B. Lambert.

"*Leaves in pairs, short, rigid, divaricate, oblique, recurved, twisted scales without prickles.*"

Description.—This species is found further north than any other American Pine. In Canada the French call it *Chiprê*, the English, Gray Pine; in Nova Scotia and New Brunswick it is frequently called "Scrub Pine."

Michaux the elder, in his 'Notes on Canada,' says, "In the environs of Hudson's Bay and the great Mestassin Lakes, the trees which compose the forests a few degrees further south, disappear almost entirely in consequence of the severity of the winter and the sterility of the soil. The face of the country is almost everywhere broken by innumerable lakes, and covered with large rocks, piled upon each other, and usually overgrown with large black lichens, which deepen the gloomy aspect of these desolate and almost uninhabited regions. Here and there, in the intervals of the

rocks, are seen a few individuals of this species of pine, which fructify, and even exhibit the appearances of decrepitude, at the height of three feet. One hundred and fifty miles farther south, its vegetation is more vigorous, but it is still not more than eight or ten feet high; and in Nova Scotia, where it is confined to the summit of the rocks, it does not exceed this stature."

The leaves of the Gray Pine are united in pairs in the same sheath, but they are disseminated over the branches, instead of being collected in bunches at the extremity; they are about an inch long, flat on the interior, and rounded on the exterior face. The cones are commonly in pairs, and are of a gray or ashy colour, which has probably given name to the species; they are about two inches long, and have the peculiarity of always pointing in the same direction as the branches. They are, besides, remarkable for naturally assuming an arching shape, which gives them the appearance of small horns; they are extremely hard, and do not open to release the seeds until the second or third year. The Canadians find a speedy cure for obstinate colds, in a diet drink made by boiling these cones in water. This is the only useful property attached to the tree.

3. White Pine—*Pinus Strobus.*

Description.—This species, the most interesting and majestic of all the American Pines, is known in the colonies by the name of White Pine, from the perfect whiteness of its wood when freshly exposed; the secondary denominations of *Pumpkin Pine* and *Sapling Pine*, are derived from certain accidental peculiarities. In England, this tree is called the *Weymouth Pine.*

The leaves of the White Pine are five-fold, four inches long, numerous, slender, and of a bluish green; the elegant appearance of the young trees is owing to the lightness and delicacy of the foliage. The cones are four or five inches long, ten lines in diameter in the middle, pedunculated, pendulous, somewhat arched, and composed of thin, smooth scales, rounded at the base. They open about the first of October, to release the seeds, of which a part is left adhering to the turpentine that exudes from the scales.

This tree is diffused, though not uniformly, over a vast extent of country; it is incapable of supporting extreme cold, and still less extreme heat. Michaux the elder, in returning from Hudson's Bay, after traversing 300 miles without perceiving a vestige of it, first observed it about forty leagues from the mouth of the river Mistassin, which discharges itself into lake St. John, in Canada, in latitude 48° 50′ north. Two degrees further south he found it common, owing rather to a difference of soil, than of climate.

The White Pine is most abundant between the parallels of 43° and 48° north latitude, and no where is it found of larger size, or of better quality, than in New Brunswick. It is seen in very different situations, and seems to accommodate itself to all varieties of soil, except such as consist wholly of sand, or such as are constantly submerged. The largest stocks are found in the bottom of soft, friable and fertile valleys; on the banks of rivers composed of deep, cool, black sand, and in swamps filled with White Cedar, and covered with a thick and constantly humid carpet of *Sphagnum.* In such situations, it sometimes reaches the extraordinary height of 160 feet, with a diameter of five feet, at three feet from the ground.

This ancient and majestic inhabitant of the North American forests, is still the loftiest and most valuable of their productions, and its summit is seen at an immense distance, aspiring towards heaven, far above the heads of the surrounding trees. The trunk is simple for two-thirds or three-fourths of its height, and the limbs are short and verticillate, or disposed in stages one above another to the top of the tree, which is formed by three or four upright branches, seemingly detached and unsupported.

In forests composed of the Sugar Maple, the Beeches and Birches, where the soil is strong, and proper for the culture of grain, this tree is arrested at a lower height, and diffused into a spacious summit, but it is still taller and more vigorous than the neighbouring trees.

In New Brunswick and Nova Scotia, it has been constantly remarked, that the White Pine is the foremost tree in taking possession of barren, deserted lands, and the most hardy in resisting the impetuous gales from the ocean. On young stocks not exceeding forty feet in height, the bark of the trunk is smooth and even polished; as the tree advances in age, it splits and becomes rugged and gray, but does not fall off in scales like that of the other Pines. The White Pine is also distinguished by the sensible diminution of its trunk from the base to the summit, in consequence of which it is difficult to procure sticks of great length and uniform diameter. This disadvantage is, however, compensated by its bulk and by the small proportion of its sap wood; a trunk of one foot in diameter, contains eleven inches of perfect wood.

Properties and Uses.—The wood of the White Pine is employed in greater quantities and for more diversified uses than that of any other American tree. Although it does not possess great strength, gives a feeble hold to nails, and sometimes swells by the humidity of the atmosphere, yet these defects are fully compensated by other properties which give it a decided superiority. It is soft, light, free from knots, and easily wrought; it is durable, and not liable to split when exposed to the sun; it furnishes boards of a great width, and timber of large dimensions, and it is still abundant and cheap.

It has been observed, that the influence of soil is greater upon resinous, than upon leafy trees. The qualities of White Pine, in particular, are strikingly affected by it. In loose, deep, humid soils, it unites in the highest degree all the valuable properties by which it is characterized, especially lightness and fineness of texture, so that it may be smoothly cut in every direction; and hence, perhaps, it has derived the name of *Pumpkin Pine.* On dry, elevated lands, its wood is firmer and more resinous, with a coarse grain and more distinct concentrical circles; it is then called *Sapling Pine.*

A cubic foot of White Pine, when seasoned, weighs about twenty-eight pounds.

Representing the stiffness of Oak by 100,		that of White Pine is	95
,,	strength of Oak by 100,	,,	99
,,	toughness of Oak by 100,	,,	92

The almost precious qualities of White Pine ensure it an immense consumption for an infinite variety of purposes, it being equally in repute for the largest masts of ships of war, and the smallest article of carving, or the interior decorations of dwelling-houses. From its exclusive use for the

ornamental work of such houses, and the extent to which it is used in the construction of buildings and erections of every kind, it may emphatically be styled the carpenter and joiner's wood.

Many complaints have been made of the tendency to dry-rot in White Pine, and its want of durability; but if properly treated, it is as durable as any other of the Pine family. At one of the public docks in England, a very extensive granary of four floors, of 9200 square feet in area, and which contains about 9000 quarters of grain, has been built entirely of Colonial White Pine, with the exception of the uprights, which are of Red Pine. It has now stood twenty years, and is stated to be in every respect perfectly sound and unwarped, It was allowed to remain five years to dry before painting, and up to this time has been painted but thrice; the architect states, that he considers it likely to stand ninety years. An extensive outside fence of White Pine was put up in England twenty-three years since, and is still perfectly sound; it also was allowed to remain five years to dry before painting. All experience both in England and America has shown, that when used for outside purposes, it should be allowed to dry thoroughly before being painted; and that unless sufficient time be given for the vegetable juices to evaporate, White Pine will suffer from the dry-rot, in the same manner as other timber under like circumstances. An instance is mentioned of a church in Hertfordshire, being fitted up with the choicest Oak, and instantly painted with several coats before the vegetable principle had exuded. In a very few years, the beautiful work in the chancel was obliged to be taken down, perfectly rotten; and, at this time, the greater part of the pews are in a similar state.

The wood of White Pine is not resinous enough to furnish the turpentine of commerce, nor would the labour of extracting it be light, as White Pine occupies, exclusively, only tracts of a few hundred acres, and is usually found mingled in different proportions with the leafy trees.

White Pine logs which are not sawn the first year, are attacked by large worms, which form holes, about two lines in diameter, in every direction; but if stripped of the bark, it is said that they will remain uninjured for thirty years. The same remark is applicable to the stumps, which resist the influences of heat and moisture during a great length of time; and it has passed into a proverb, that the man who cuts down a Pine tree never lives to see the stump decay.

The most usual forms in which White Pine is extensively exported from New Brunswick are—as squared timber, masts, spars, deals, planks, boards, scantling, clapboards, palings, shingles, laths; and also in boxes, barrels, and water-pails. It would be quite impossible to enumerate the variety of purposes to which it is applied, both in Europe and America.

1. Black Spruce—*Abies Nigra.*

"*Leaves four-sided, scattered on all sides of the branches, erect, straight, cones ovate, scales oval, with undulated margins, close toothed at the apex.*"

Description.—This tree, which appertains to the colder regions of North America, is called *Epinette noire* and *Epinette à la bière* in Canada, Double Spruce in the United States, and Black Spruce in New Brunswick and Nova Scotia. From the influence of soil upon the wood, this spruce is sometimes called Red Spruce, and this variety has been mistaken for a distinct species; it is found most frequently in Prince Edward Island,

owing, no doubt, to the influence of the deep rich soil of that fertile island upon the quality of the wood.

The Black Spruce is stated to be most abundant in the countries lying between the 44th and 53rd degrees of north latitude, and between the 55th and 75th degrees of west longitude, comprising all the North American colonies (except part of Canada West), Maine, Vermont, and the northern part of New Hampshire. Farther south it is rarely seen, except in cold and humid situations on the tops of the Alleghanies.

It is so multiplied in New Brunswick as to constitute a third part of the forests by which the province is almost uninterruptedly covered, and nowhere is it found of larger size or finer quality. The localities in which it most abounds are often diversified with hills, and the finest forests are found in valleys where the soil is black, humid, deep, and covered with a thick bed of moss. Though crowded so as to leave intervals of only three, four, or five feet between the several trees, they there attain their fullest development, which is from seventy to eighty feet in height, and from eighteen to twenty-four inches in diameter. On the declivities of hills, where the soil is stony, dry, and covered only with a thin bed of moss, the growth of the Black Spruce is less luxuriant, and its stature less commanding. The wood of the trees grown near the sea-coast has been found the hardest and most durable.

The leaves are of a dark gloomy green, about four lines long, firm, numerous, and attached singly over the surface of the branches. The flowers appear at the extremity of the highest twigs, and are succeeded by small, reddish, oval cones, pointing towards the earth, and varying in length from eight lines to two inches. The cones are composed of thin scales, slightly notched at the base, and sometimes split for half their length on the most vigorous trees, on which also the cones are the largest. They are not ripe until the end of autumn, when they open for the escape of the seeds, which are small, light, and surmounted by a wing, by means of which they are wafted abroad by the wind. In the meagre spots known as "poor black lands," the Black Spruce has shorter, thicker leaves, of a still darker colour, with cones only half as large, but similar in form, and ripe at the same period with those upon trees growing in a better soil.

The trunk, unlike that of the pines, is smooth, and is remarkable for its perpendicular ascension, and for its regular diminution from the base to the summit, which is terminated by an annual shoot, twelve or fifteen inches long. The summit is a regular pyramid, and has a beautiful appearance on insulated trees, which are frequently observed in the distance like a black minaret, or spire, towering twenty or thirty feet above the other forest trees. This agreeable form is owing to the spreading of the branches in a horizontal instead of a declining direction, like those of the true Norway Spruce, which is a more gloomy tree.

In New Brunswick, as in the north of Europe, great ravages are committed among trees of the fir tribe by several insects, of which the most destructive is the *Bostrichus Piniperda*. This little animal introduces itself into the cellular integument of the bark, and succeeds in dividing it from the trunk. The separation of the bark prevents the circulation of the sap, and hence results the inevitable death of the tree. These insects have of late years been very injurious to the Black Spruce in several districts in New Brunswick, where that tree abounds, and their ravages have also

extended to the Cedar, the Larch, and the Hemlock Spruce. In dense groves of trees of the fir tribe, where a few only are felled, these insects multiply rapidly on the tops and branches which are left after the removal of the trunk, and they thence extend to the standing timber, attacking generally the oldest trees and those which have any defective part. Young and thrifty trees resist their attacks; and the best mode of preventing or avoiding the ravages of these destructive little insects is worthy of inquiry.

Properties and Uses.—The inhabitants of these colonies, and the mechanics who work in wood, notice only the striking appearances in forest trees, such as the quality of the wood, its colour, and that of the bark; and from ignorance of the botanical character, they give different names to the same tree, according to certain variations arising from local circumstances. To this cause must be attributed the popular distinction of *Black* and *Red* Spruce.

The wood of the Black Spruce is white, and that of the other variety reddish, produced only by the influence of soil. It is said, however, that the red variety unites, in the highest degree, all the good qualities which characterize the species, is superior in size, and less liable to be crooked.

The distinguishing properties of the Black Spruce are strength, lightness, and elasticity. It furnishes as fine yards and topmasts as any in the world, for which it has been long and extensively used.* It is much used for the knees of vessels, which are formed of the base of the trunk and one of the principal roots, and these knees possess great strength and much durability. By many the wood of the Black Spruce is preferred to that of the White Pine for flooring, for which it is much used; but its great value arises from its furnishing the Spruce deals of commerce, which now constitute one of the largest and most valuable exports of New Brunswick. These deals are of the uniform thickness of three inches, not less than twelve feet in length, and nine inches in breadth. The most usual dimensions are nine and eleven inches in width, and lengths of twelve, fourteen, sixteen, eighteen, and twenty-one feet. Spruce battens are twelve feet long, seven inches in width, and two and a half inches in thickness. The manufacture of Spruce deals commenced in New Brunswick about the year 1819, and has since been increasing. The erection of steam sawmills within a few years, has greatly increased this branch of business, and much enhanced the value of Spruce logs..

The weight of a cubic foot of the wood of the Black Spruce when dry, is about twenty-nine pounds.

Representing the strength of oak by 100,			that of Spruce will be	86.
„	„ stiffness of oak by 100,		„	72.
„	„ toughness of oak by 100,		„	102.

The shrinkage is about one-seventieth part in becoming perfectly dry. The wood stands extremely well when properly seasoned. It is not resinous enough to afford turpentine as an article of commerce. The wood is filled with air, and snaps very much in burning.

From the young branches of the Black Spruce is made the salutary drink known by the name of Spruce beer, which in long voyages is found an effi-

* Josselyn, in his 'History of New England,' published in London in 1672, speaks of the Black Spruce of America as furnishing the best yards and spars for shipping ever known.

cacious preventive of scurvy. The twigs are boiled in water, a certain quantity of molasses or Maple sugar is added, with a little yeast, and the mixture is left to ferment. The essence of Spruce is obtained by evaporating to the consistence of an extract the water in which the summits of the young branches have been boiled. A very small quantity of the essence, say two ounces, is sufficient for a barrel of beer; and the labour of making this pleasant drink is thereby very much abridged. The fishermen of Newfoundland and the Gulf of St. Lawrence, drink large quantities of Spruce beer; it is considered an admirable corrective of their diet, which consists principally of very fat pork, called by them "clear sheer."

The leaves and buds of the Black Spruce are not known to be eaten by any living thing except the "Spruce partridge," which picks the buds in the spring of the year, whence it derives its name, and its bitter flavour.

2. White Spruce—*Abies Alba.*

Description.—This species flourishes in the same countries as the preceding, but is not found quite so far north. In returning from Hudson's Bay, Michaux the elder, first saw it near Lake St. John, between the 48th and 49th parallels. In Canada, it is called *Epinette Blanche;* in New Brunswick, Nova Scotia, and Prince Edward Island, "White" Spruce, and "Single" Spruce. From the unpleasant smell of the foliage, it is sometimes called "Cat" Spruce.

It is much less common in New Brunswick than the Black Spruce; the comparison is easily made, as they are readily distinguished, especially the young and insulated stocks. Though the leaves of both encompass the branches, they are marked by several characteristic differences. Those of the White Spruce are less numerous, longer, more pointed, at a more open angle with the branches, and of a pale bluish green; the cones are also peculiar, being of a lengthened oval form, about two inches in one direction, and six or eight lines in the other; the dimensions vary according to the vigour of the tree, but the form is unchangeable. The scales are loose and thin, with entire edges unlike those of the Black Spruce; the seeds also, are rather smaller, and are ripe a month earlier.

The White Spruce has a more tapering trunk than the Black Spruce, and is inferior in stature, rarely exceeding fifty feet in height, and sixteen inches in diameter at three feet from the ground. Its summit, like that of the Black Spruce, is a regular pyramid, but less branching, and tufted. The bark is lighter coloured, and this difference is most striking upon the young shoots.

Both the Black and the White Spruce are easily propagated by their seeds, or by transplanting into proper soils; they afford one of the most dense and compact screens, or shelters from the wind, that can be made by trees. They are cleanly, and although of slow growth, durable, living to a great age. They abound in thick masses, of stinted growth, on the rocky shores and inlets of the Bay of Fundy. Their dark green, but conical tops, contrast strongly with the snow during the cold season, and they form one of the most striking characteristics of a winter scene on the sea-board, living and thriving as they do, where other trees could scarcely obtain foothold, and seeming to bid defiance both to the ocean and the storm, even during a combination of their utmost strength.

Properties and Uses.—The wood of the White Spruce is employed in nearly the same uses as the Black, but it is somewhat inferior in quality; although the deals made from this species are mixed with those of the other species, without distinction.

The fibres of the roots, macerated in water, are very flexible and tough; being deprived in the operation of their pellicle, or their covering, they are used by the Indians to stitch together their canoes of Birch bark, their dishes and water-pails of the same material. The seams of the canoes, and of the water-pails, are rendered water-tight by a resin, improperly called *gum*, which exudes from knots and wounds on the trunk of this tree, whence it is gathered, melted and boiled, to free it from impurities. The branches are not used for beer, because the leaves, when bruised, diffuse the unpleasant odour already mentioned, which is communicated to the liquid.

3. Hemlock Spruce—*Abies Canadensis.*

Description.—The Hemlock Spruce is generally known by that name throughout North America; in Canada, the French call it *Pruche*. It is natural to the coldest regions of America, and begins to appear about Hudson's Bay, in latitude 51° north. In New Brunswick, it forms a large proportion of the evergreen forests, and is found abundantly multiplied in every favourable situation. Moist grounds appear not to be in general the most favourable to its growth. When mingled with Black Spruce, it predominates less, as the soil is more humid, and large stocks are often seen among the Beeches and Sugar Maples, or soils proper for the culture of grain. The writer observed a very considerable tract of level land, rather dry and sandy, almost exclusively covered with large trees of the Hemlock Spruce, and the Red and White Beech, on the banks of the river Tabusintac, in Northumberland.

The Hemlock Spruce is always larger and taller than the Black Spruce. It frequently attains the height of seventy or eighty feet, with a diameter from two to three feet, and uniform for two-thirds of its length. If the number and distance of the concentrical circles afford a certain criterion of the longevity of trees and the rapidity of their vegetation, it must be nearly two centuries in attaining these dimensions.

The leaves are six or eight lines long, flat, numerous, irregularly disposed in two ranks, and downy at their unfolding. The cones are a little longer than the leaves, oval, pendulous, and situated at the extremity of the branches.

In a favourable soil this tree has an elegant appearance, while less than thirty feet high, owing to the symmetrical arrangement of its branches, and to its tufted foliage. When arrived at its full growth, the large limbs are usually broken off, four or five feet from the trunk, and the dried extremities are seen staring out through the little twigs that spring round them. In this mutilated state, by which the tree is easily recognised, it has a disagreeable aspect, and presents, while in full vigour, an image of decrepitude. This accident, which is attributed to the snow lodging upon the close, horizontal, tufted branches, and breaking them off, never happens to the young trees whose fibres are more flexible. The woods are also filled with dead stocks, but it is not known whether their destruction is occasioned by an insect which attaches itself to the Hemlock Spruce, in preference to other trees of the fir tribe, or arises from some other cause.

The dead, moss-grown trees, which stand mouldering for twenty or thirty years, frequently deform the forests of New Brunswick, and give them a gloomy and desolate appearance.

The Hemlock Spruce is distinguished by the peculiarity of sometimes ceasing to grow at the height of twenty-four or thirty inches. In this state it has a pyramidical shape, and its compact, tufted branches adhere to the ground.

Properties and Uses.—The properties of this species of Spruce are such as to give it only a secondary importance, notwithstanding its abundant diffusion; and it has hitherto been considered among the least valuable of the large resinous trees of North America. Yet it is well adapted for mining, for wharf-building, or for use in situations where it is constantly wet. It gives a tight hold to nails, and iron driven into it will not corrode, in or out of water. Within a very short period it has risen so much in public estimation, that large quantities have been exported to England for railway sleepers, and contracts have been entered into for the supply of still larger quantities. Heretofore it has only been exported in the shape of lathwood, of which large quanties have been shipped to Great Britain, where split laths have been made from it.

The old trees frequently have the concentrical circles separated at intervals, or, in the language of the country, are *shaky*, which greatly impairs the strength of the wood. This effect is produced by the winds, which have a powerful hold on a large compact summit, exposed above the heads of the surrounding trees. It has been recommended to cut off the lower part of the trunk of trees thus defective, and to use only the upper part, which is generally more perfect.

The wood of Hemlock Spruce is firmer than that of White Pine, although coarser grained, gives a better hold to nails, and offers more resistance to the impression of other bodies. As two-inch plank, it is frequently employed for thrashing floors, and also for oat-bins, because, as is alleged, rats will not gnaw the wood. As inch-boards, its most common use is for the first covering of the frames of houses, called "rough boarding," which is afterwards covered either with clapboards, siding, or shingles of White Pine. When guarded from humidity, the wood of the Hemlock Spruce is as durable as any other species of Spruce, or even Pine. In Maine, Hemlock is usually taken for the posts of rural fences, which last about fifteen years.

This species contains but little resin; the trunk is but slightly coated with turpentine, where large pieces of bark have been removed a long time. The bark is extensively used in tanning; half the epidermis is shaved off before it is thrown into the mill for grinding. It is inferior to Oak bark, but tanners in the United States say that both united are better than either. Small consignments have occasionally been made to London, but the tanners there could not be induced to adopt it.

The fibre of the wood of the Hemlock Spruce is sometimes so oblique, that it makes the circuit of stocks fifteen or twenty inches in diameter, in ascending five or six feet.

4. American Silver Fir—*Abies Balsamifera.*

Description.—This species of Fir is sometimes called Balsam Fir, and times Silver Fir. It is found in the coldest regions of North America;

in New Brunswick it does not constitute masses of wood, but is disseminated, in greater or less abundance, among the Hemlock and Black Spruces. Its height rarely exceeds forty feet, with a diameter of from twelve to sixteen inches. The body tapers from a foot in diameter at the surface of the ground, to seven or eight inches at the height of six feet. When standing alone, and developing itself naturally, its branches, which are numerous and thickly garnished with leaves, diminish in length in proportion to their height, and form a pyramid of perfect regularity. The leaves are six or eight lines long, and are inserted singly on the sides, and on the top of the branches; they are narrow, rigid, and flat, of a bright green above, and a silvery white beneath, whence the name of the tree is probably derived. The cones are nearly cylindrical, four or five inches long, an inch in diameter, and always directed upwards; this characteristic belongs also to the Silver Fir of Europe, and distinguishes these species from others of the Fir tribe, whose cones are turned towards the earth.

Properties and Uses.—The wood of the Silver Fir is light and slightly resinous; it is very white, except the heart, which is sometimes yellowish. A cubic foot, when seasoned, weighs only twenty-five pounds; yet like other kinds of Fir it is stiff, and does not bend much under a considerable weight. It lasts longer in the air than in water, and its principal use, hitherto, has been in the form of inch boards, for the outside covering of farm-buildings. The great abundance and cheapness of White Pine and Spruce, have caused the wood of the Silver Fir to be much undervalued.

The well-known Fir Balsam is procured from this tree. It is naturally deposited in vesicles on the trunks and limbs, and is collected by bursting these tumours, and receiving their contents in a shell or cup. The fresh turpentine thus obtained is a greeenish, transparent fluid, of an acrid, penetrating taste; it has been highly celebrated in England for medicinal and other purposes, and is there generally designated Canada balsam. It makes a very fine transparent varnish for water-colour paintings, which does not become darker with time.

The Indians use the Fir Balsam as a remedy for several internal complaints, and they also apply it externally in cases of fresh wounds. Their practice, in this respect, has been adopted by the settlers in remote districts, but it is really very improper and dangerous in many cases. When given inconsiderately, it produces heat in the bladder, and when applied to wounds, it causes inflammation and acute pains.

When camping in the forest, hunters, surveyors, and lumbermen adopt the invariable practice of the Indians, in selecting the branches of the Silver Fir for their bed. They are fragrant and cleanly, and when the young branches are broken off short, and properly laid down, the points all in one direction, lapping over each other, and thus covering the butts, they form no mean bed. Many a refreshing night's rest has the writer enjoyed upon them, after a long and fatiguing day in the forest, with feet stretched to the camp fire, no covering but a blanket, and the canopy of heaven above.

LARCH—Larix.

The trees of the Larch tribe are now most frequently classed under the genus *pinus*, as members of the Pine family, to which they properly belong;

but as this classification is not yet understood in New Brunswick, the only species which is found in its forests, is ranked under the separate head of *Larix* Larch), as usual with the older botanists.

American Larch—*Larix Americana.*

"*Leaves deciduous, cones oblong, margin of the scales bent in, bracts fiddle-shaped.*"

Description.—The French Canadians call this tree *Epinette rouge,* and the descendants of the Dutch in America have called it *Tamarack.* It is most generally designated in New Brunswick by the Indian name of *Hackmatack;* but on the northern or gulf shore of the province, it is sometimes styled *Cypress,* yet much more frequently *Juniper,* to neither of which designations has it the slightest claim.

The European and American Larches are more strictly confined than any other resinous trees to the northern zone of the two continents, and they are the first to disappear in approaching a milder sky. The American species is most abundant and of the largest size between the parallels of 43° and 48° north latitude, which includes the whole of New Brunswick, Nova Scotia, and Prince Edward Island. In these colonies it most frequently grows in low and moist places, often forming dense masses of wood, of very considerable extent. From its great hardihood and capacity of vegetating with a very small degree of heat, it is enabled to brave the greatest intensity of cold, and is found growing in the vicinity of Hudson's Bay, and in Newfoundland, to its northernmost extremity.

The American Larch, like that of Europe, is a magnificent vegetable, with a straight slender trunk, eighty feet or more in height, and upwards of two feet in diameter. Trees of this size, and even larger, are most abundant in the counties of Kent, Northumberland, and Gloucester, but of greater or less size they abound throughout New Brunswick. The numerous branches of this tree, except near the summit, are horizontal or declining. The bark is smooth and polished on the trunk and larger limbs, and rugged on the smaller branches. The leaves are flexible, shorter than those of the European species, and collected in small bunches; they are shed in the autumn and renewed in the spring. The flowers, like those of the Pines, are separate upon the same tree; the male aments, which appear before the leaves, are small, oblong, and scaly, with two yellow anthers under each scale. The female flowers are also disposed in aments, and are composed of floral leaves covering two ovaries, which in process of time become small, erect, scaly cones, three or four lines long. At the base of each scale lie two minute winged seeds. On some stocks the cones are violet-coloured in the spring, instead of green, but this is an accidental variation, as the trees are in no other respects peculiar.

The Larch tree does not bear the least clipping, as the terminating buds send forth the branches. The roots spread near the surface of the earth, except the central root, which pushes perpendicularly downwards. If this "tap-root" is broken off, or interrupted in its descent, the stem ceases to shoot upwards, and the tree remains a dwarf.

Sir A. B. Lambert, in his splendid work on the Pines, describes two species of American Larch—*Larix Americana* and *Larix Microcarpa*—the latter characterized by smaller cones and more drooping branches. But

there would seem no real foundation for the distinction, and *Larix Microcarpa* is not now considered a distinct species, but merely a variety of the *Larix Americana*, the difference being occasioned by the influences of soil and situation, which so much affect all the resinous trees. Linnæus states that Larch trees live to the age of 400 years; but, judging from the number of concentrical circles in large trees, they would seem to attain even a greater age in New Brunswick.

Properties and Uses.—Michaux the younger says—"The wood of the American Larch is superior to any species of Pine or Spruce, and unites all the properties which distinguish the European species, *being exceedingly strong, and singularly durable.*" Tredgold says it is extremely durable in all situations, failing only where any other wood would fail; and for this property of durability it has been celebrated from the time of Vitruvius, who regrets that it could not be easily transported to Rome, where such a wood would have been so valuable. It appears, however, that this was sometimes done, for we are told that Tiberius caused the Naumachiarian bridge, constructed by Augustus, and afterwards burnt, to be rebuilt of Larch planks brought from Rhætia. Among these was a trunk 120 feet in length, which excited the admiration of all Rome. Wiebeking, in his celebrated work on bridges, says that Larch is preferable to the Pine, Pineaster, or the Fir, for constructing the arches of wooden bridges.

"Many encomiums (says Hanbury in speaking of this tree) have been bestowed on the timber of the Larch; and we find such a favourable account of it in ancient authors as should induce us to think it would be proper for almost any use. Evelyn quotes a story of Witsen, a Dutch writer, that a ship built of this timber and Cypress had been found in the Numidian sea, twelve fathoms under water, sound and entire, and reduced to such a hardness as to resist the sharpest tool, after it had lain submerged above 1400 years. Certain it is, this is an excellent wood for ship and house building."

The borderers on the lake of Geneva prefer it for building their vessels. In some parts of Kamschatka it arrives at a considerable size, and is there used for ships, which last extremely well.

Painters, from the time of Pliny to that of Raphael, trusted their works to this wood, which the Roman naturalist styles *immortale lignum.*

The wood of the American Larch is highly esteemed in New Brunswick and the other North American colonies for ship building, especially for knees, the butt of the stem and one of the principal roots forming together the angle required. For ship planks it is also much used; and few descriptions of wood, if any, are superior to it for this purpose. It is now exported largely to Great Britain, of specific dimensions, for railway sleepers, for which it would seem to be admirably adapted, not only from its strength and durability, but because it bears driving bolts and nails better than any other kind of the resinous woods. It is peculiarly adapted for flooring-boards in situations where there is much wear, and for stair-cases: in the latter, its fine colour when rubbed with oil, renders it greatly preferable to any painted wood, from economy alone. It is also well adapted for doors, shutters, and the like, as from the beautiful colour of the wood when varnished, painting is not necessary. It makes excellent tree-nails, little if at all inferior to those of the Acacia, or Locust tree.

The wood of the Larch tree is said to be much improved in hardness by

barking the trees in spring, and felling them late in the autumn. The wood becomes very hard by seasoning, burns with difficulty, and does not readily absorb water. The weight of a cubic foot when dry, varies from thirty-five to forty-one pounds.

Representing the mean strength of Oak by 100, that of Larch will be 103.
" " stiffness of Oak by 100, " " 79.
" " toughness of Oak by 100, " " 134.

It is therefore stronger and much tougher than Oak, but not so stiff; and it has been recommended by Tredgold that, with a view to improve the stiffness of the wood for joists and beams, further experiments should be made of barking trees some time before they are felled. From the form of the tree, barking could be easily accomplished as far as necessary.

An infusion, or tea, of the larch buds is highly recommended as an anti-scorbutic. The young shoots distilled afford a fragrant essential oil. Turpentine is never extracted from the American Larch, as from the similar species in Europe.

The many admirable qualities of larch timber, and its acknowledged value, require that some judicious measures should be adopted to prevent the great waste and destruction of Larch trees now taking place in New Brunswick.

CYPRESS.—Genus *Cupressus.*

Natural Order—*Coniferæ.*

The Cypress of New Brunswick (always called "Cedar") is the *Cupressus* of Pliny, and the *Cyparissus* of Virgil: it must by no means be confounded, as frequently happens, with the Southern Cedar, which is of the Juniper tribe, nor yet with the Cedar of Lebanon, which belongs strictly to the Pine family, and is designated by botanists *Pinus Cedrus.* Only one species of this genus is found in New Brunswick, and is thus described:—

White Cedar—*Cupressus Thyoides.*

Description.—The White Cedar grows almost always in wet ground. In swamps, the trees sometimes stand so thick, that the light can hardly penetrate their foliage. It seldom exceeds forty or fifty feet in height, and rarely more than two feet in diameter. When the White Cedars are close and compressed, the trunk is straight, perpendicular, and destitute of branches to the height of fifteen or twenty feet.

The epidermis is very thin on the young stocks; but, as they grow older, it becomes thick, of a soft filaceous texture, and of a reddish colour. When cut, a yellow transparent resin of an agreeable odour exudes, in very small quantity. The foliage is evergeen; each leaf is a little branch numerously subdivided, and composed of small, acute, imbricated scales, on the back of which a minute gland is discerned with the lens. In the angle of these ramifications grow the flowers, which are scarcely visible, and which produce very small rugged cones, of a greenish tint, which changes to bluish in the autumn, when they open to release the fine seeds.

The concentrical circles are always perfectly distinct, even in stocks of considerable size; but their number and compactness prove that the tree arrives at its full growth only after a long lapse of years. Michaux states that he counted 277 annual layers in a trunk twenty-one inches in diameter, at five feet from the ground; and 47 in a plant only eight inches thick at the surface, which proved it to be then fifty years old.

Properties and Uses.—The wood of the White Cedar is light, soft, fine grained, and easily wrought. When perfectly seasoned, and exposed some time to the light, it is of a rosy hue. It has a strong aromatic odour, which it preserves as long as it is guarded from humidity. The perfect wood resists the succession of dryness and moisture for a great length of time, and this constitutes its great value for fencing. Rails of split cedar have been known to last for fifty to sixty years, *when deprived of the bark.* Shingles of White Cedar have been known to last upwards of thirty years.

The largest stocks of the White Cedar are now much sought after in New Brunswick by boat-builders, who use it when sawed into very thin boards, for the construction of light boats, especially for those used in the Whale Fishery.

The superior fitness of this wood for various household utensils, has given rise in the United States to a distinct class of mechanics, called "Cedar Coopers," who principally fabricate large and small tubs, pails, churns, and other household utensils, as well for export as for home consumption. This ware, instead of becoming dull like that of other wood, becomes whiter and smoother by use. It is esteemed the best wood in which to preserve oils. Charcoal, highly esteemed in the manufacture of gunpowder, is made of young stocks about an inch and a half in diameter, deprived of their bark. The seasoned wood affords a beautiful lamp-black, lighter and more intensely coloured, though less abundant than that obtained from the Pine.

ARBOR VITÆ.—Genus *Thuya.*

There is but one species of the trees of the genus *Thuya,* in New Brunswick, which have ever been confounded with the White Cedar, owing to their both being found in swamps, the similarity of their foliage, their general resemblance when growing, and the equal durability of their wood.

American Arbor Vitæ—*Thuya Occidentalis.*

Description.—This species of *Thuya,* the only one that has been found in America, is considered the most interesting of the genus, for the valuable properties of its wood. It abounds in favourable situations in New Brunswick, and is found as far north as latitude 48° 50′. South of latitude 45° it becomes rare, and solitary stocks only are seen on the sides of torrents, and the banks of a few rivers in the Northern States of the Union.

Two varieties have been noticed in New Brunswick, which have been designated "Striped-leaved," and "Sweet-scented."

The Arbor Vitæ is sometimes upwards of forty feet in height, with a diameter of two feet and more at the base. Usually, however, it is not

more than ten or fifteen inches in diameter at five feet from the ground. From the number of concentrical circles in stocks of this size, its growth must be extremely slow. They are more compressed near the centre, as in the Cyprus and White Cedar, which is contrary to the arrangement observed in the Oaks, the Beeches, and the Maples.

The foliage is evergreen, numerously ramified, and flattened or spread. The leaves are small, opposite, imbricated scales; when bruised they diffuse a strong aromatic odour. The sexes are separate upon the same tree. The male flowers are in the form of small cones; to the female blossom succeeds a yellowish fruit about four lines in length, composed of oblong scales, which open through their whole length for the escape of several minute seeds, surmounted by a short wing.

A cool soil seems to be indispensable to its growth. It is never seen on the uplands among the Beeches, Birches, and Maples, but is found on the rocky edges of the innumerable streams and small lakes scattered over New Brunswick. It frequently occupies exclusively, or in great part, swamps from fifty to one hundred acres in extent, some of which are accessible only in the winter, when they are frozen and covered with deep snow. It abounds exactly in proportion to the degree of humidity, and in the driest marshes it is mingled with the Black Spruce, Hemlock Spruce, the Yellow Birch, the Black Ash, and a few stocks of the White Pine. In all these marshes the surface is covered with a bed of *Sphagnum*, so thick and surcharged with moisture that the foot sinks half-leg deep, while the water rises under its pressure.

The full grown Arbor Vitæ is easily distinguished by its shape and foliage. The trunk tapers rapidly from a very large base to a very slender summit, and is laden with branches for four-fifths of its length. The principal limbs, widely distant, and placed at right angles with the body, give birth to a great number of drooping secondary branches, whose foliage resembles that of the White Cedar.

On the borders of the lakes, where it has room, and enjoys the benefit both of light and air, it rises perpendicularly, grows more rapidly, and attains a greater size than when crowded in the swamps, where its thick foliage intercepts the light, and impedes the circulation of air. It has been remarked, that in swamps its trunk is rarely straight, but is more or less curved. Its sides swell into two or three large ridges, which are a continuation of the principal roots. The bark upon the body is slightly furrowed, smooth to the touch, and very white when the tree stands exposed.

Properties and Uses.—The wood of the Arbor Vitæ is reddish, somewhat odorous, very light, soft, and fine-grained, and takes high rank for durability. The wood so closely resembles that of the White Cedar, that no distinction is made between them, and they are applied indifferently to the same uses. The White Cedar is a taller tree, of a more uniform diameter, more rapid in its growth, and the wood is a little inferior in durability. From the shape of the trunk of the Arbor Vitæ, it is difficult to procure sticks of considerable length, and an uniform diameter.

The posts of rural fence, whether of White Cedar or Arbor Vitæ, are said to last twice as long in argillaceous as in sandy lands. Care should be taken in all cases to strip them entirely of the bark. While the use of such fences continue, the utmost economy should be exercised in cutting the